Grand Canyon National Park
South Rim

Emergency Services Facility

Final Environmental Assessment

May 2001

Note to Reviewers and Respondents

This environmental assessment/assessment of effect will be on public review for 30 days. If you wish to comment on the environmental assessment, you may mail comments to the name and address below, no later than June 25, 2001. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please Address Comments to:
Sara White, Chief Compliance Officer
Grand Canyon National Park
P.O. Box 129
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Grand Canyon, Arizona 86023

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

The purpose of this document is to disclose the expected effects to the environment of various alternative building designs and sites for the proposed South Rim emergency service building. The National Park Service (NPS) proposes to construct a building to house structural fire protection, search and rescue (SAR), and emergency medical services (EMS) operations in the Grand Canyon Village area of Grand Canyon National Park, Coconino County, Arizona. This proposal implements a portion of the *1995 General Management Plan* for Grand Canyon National Park (GMP) and is part of a comprehensive effort outlined in the GMP to enhance the character of the historic district at Grand Canyon Village and provide efficient emergency services (GMP page 32 and 36). The GMP refers to this proposal as a "new fire and safety building for the Park Service and Grand Canyon National Park Lodges".

To enhance the character of the historic district at Grand Canyon Village, the GMP proposes to convert the powerhouse area of the historic district to an education campus and pedestrian area with interpretive and visitor services facilities housed in historic structures. The GMP proposes to relocate management support functions from the powerhouse area to other areas in the Village. This includes the relocation of concessionaire maintenance operations from the powerhouse area to the current NPS maintenance facility.

PURPOSE AND NEED

The purpose of this proposal is to increase operational efficiency by consolidating operations for structural fire protection, search and rescue, and emergency medical services (hereafter collectively referred to as emergency services). The proposed emergency services facility is needed because:

- Emergency service vehicles are currently stored at the NPS maintenance facility, which needs to be vacated to implement proposals in the GMP to enhance the powerhouse area of the historic district.
- The NPS maintenance facility is too small to accommodate all emergency service vehicles. Two ambulances are currently stored outside of the NPS maintenance facility, which contributes to equipment decay and high repair and replacement costs.
- Co-locating emergency services with maintenance operations creates hazardous conflicts between emergency traffic/employees and maintenance traffic/employees.
- The SAR cache and one rescue vehicle are located at the old NPS warehouse, which is inadequate due to security and utilities.
- Additional SAR equipment is stored at the helibase, creating inefficiencies due to equipment located at multiple locations.
- Offices for emergency services are currently located with EMS operations at the ranger operations building, creating inefficiencies due to supervisors being located away from equipment, supplies, and staging areas.
- Occupational Safety and Health Administration (OSHA) and National Fire Protection Association (NFPA) standards are not being met for apparatus space, exposure to fumes, and temperature control.

MANAGEMENT AND PLANNING HISTORY

Grand Canyon National Park is currently operating under the direction of the *1995 General Management Plan* (GMP). This plan provides guidance for resource management, visitor use, and general development for a period of 10 to 15 years. The GMP designates the Grand Canyon Village area as a development zone, which prescribes the area to provide and maintain facilities for serving park managers and visitors. Management objectives defined in the GMP for facility design include the following:

- Consistent with its purpose, strive to make Grand Canyon National Park a model of excellence in sustainable design and management through such means as energy efficiency, conservation, compatibility with historic setting and architecture, recycling, accessibility, and the use of alternative energy sources.
- Encourage appropriate use and adaptive reuse of historic structures, while preserving historic integrity.
- Ensure that development and facilities within the park are necessary for park purposes.
- Design high-quality facilities that exemplify visual consistency and appropriateness.
- Ensure that park developments and operations do not adversely affect park resources and environments, except where absolutely necessary to provide reasonable visitor access and experiences.

The GMP also provides management direction for changes at Grand Canyon Village including the decision to construct a new emergency services facility (GMP page 36), which was referred to in the GMP as "fire and safety building" and "fire safety facility". In addition, the GMP analyzed the environmental consequences of implementing these actions and various alternatives to these actions.

In February 2000, an interdisciplinary team from Grand Canyon National Park and NPS Denver Service Center met to review proposed sites for the emergency services facility, determine location criteria, determine building program criteria, and identify issues and concerns. This team evaluated the GMP proposed site for the emergency services facility and determined the site was not suitable due to the small size of the site, limited opportunity for future expansion of the facility, and possible conflicts with maintenance and the future concessionaire warehouse operation.

In April 2000, an interdisciplinary team from Grand Canyon National Park, NPS Denver Service Center, and Bureau of Reclamation Technical Service Center met to conduct a value analysis study on the proposed sites for the emergency services facility. A value analysis is a systematic approach of evaluating alternatives in context with the value of identified issues, concerns, and functions. This team evaluated seven sites and refined the site layout based on field review of the sites. A preferred site was identified by the team based on impacts to natural and cultural resources; conflicts with other park uses; public/employee health, safety, and welfare; operational efficiency; ability to adaptively reuse existing infrastructure; opportunities for sustainability; and cost.

In June 2000, an interdisciplinary team from Grand Canyon National Park, NPS Denver Service Center, and Bureau of Reclamation Technical Service Center met to conduct a value analysis study on the basic floor plan, building orientation, and building program for the emergency services

building. This team evaluated two building concepts for the site identified as a preferred site in the April 2000 value analysis. One of the building concepts, which proposes to adaptively reuse the clinic building, was refined and evaluated in the value analysis. A preferred floor plan, building orientation, and building program were identified by the team based on impacts to natural and cultural resources; adaptation to the existing site conditions; public/employee health, safety, and welfare; operational efficiency; ability to adaptively reuse existing infrastructure; opportunities for sustainability; and cost.

This EA incorporates by reference and tiers to the *General Management Plan Environmental Impact Statement* (GMP EIS). In addition, this EA incorporates by reference the *Value Analysis - South Rim Emergency Services Building Site Location* (Site VA) and the *Value Analysis - South Rim Emergency Services Building Program* (Building VA).

ISSUES AND IMPACT TOPICS

Issues are objections or disputes with a proposed action, based on some anticipated effect. Issues were identified by the interdisciplinary teams involved with the two value analyses conducted for the site and building. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics were then selected for detailed analysis based on substantive issues; environmental statutes, regulations and executive orders; and NPS Management Policies (2001). A summary of the impact topics and rationale for selection/dismissal are given below.

Impact Topics Analyzed in this Document

Soils. Proposed ground disturbance would displace soils and could adversely impact soil properties. Therefore, this topic will be analyzed in this document.

Ponderosa-Pinyon-Gambel Oak-Juniper Habitat. The major vegetation community type that would be affected is ponderosa-pinyon-gambel oak-juniper. Therefore, this topic will be analyzed in this document.

Exotic Vegetation and Noxious Weeds. Proposed ground disturbance could create conditions favorable to exotic vegetation and noxious weeds. In addition, construction equipment could spread existing populations of exotic vegetation or introduce seeds to proposed construction sites. Therefore, this topic will be analyzed in this document.

Threatened, Endangered, and Species of Concern – Wildlife. The U.S. Fish and Wildlife Service has listed the California condor (*Gymnops californianus*) as experimental/nonessential. California condors have been sited in the vicinity of the Grand Canyon Village area. Therefore, impacts to threatened, endangered, and wildlife species of concern will be analyzed in this document.

Traffic Flow. All action alternatives propose to construct the emergency services facility in close proximity or adjacent to Center Road, which is a main thoroughfare at Grand Canyon Village. Therefore, impacts to traffic flow will be analyzed in this document.

Historic District/Structures. All alternative project locations evaluated in this EA are located outside the Grand Canyon Village Historic District (a National Historic Landmark property). However, the locations are distributed along Center Road in relative proximity to the district [within approximately .8 kilometer (.5 mile) south of the district boundary]. The potential impacts of new construction in proximity to the historic district are evaluated.

The existing clinic building was built in 1967 as part of the National Park Service's "Mission 66" construction program. Cultural resource issues (evaluated under Alternatives E and F) concern the building's potential historical/design significance and the anticipated effects of adaptively using the building, and constructing a new addition or stand-alone building for EMS operations.

Cultural Landscapes. Center Road represents a portion of the original South Entrance Road, recognized as a cultural landscape structure contributing to the significance of the Grand Canyon Village Historic District. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged. Potential project-related impacts on the historic integrity and alignment of Center Road are evaluated.

Archeological Resources. A previously recorded prehistoric archeological site is located near the existing clinic building within the area of potential project impacts associated with Alternatives E and F. Several other archeological sites have been recorded in the South Rim area and the site potential throughout the area is high. Potential project impacts on archeological resources are therefore evaluated.

Impact Topics Dismissed

Geology and Topography. Alteration of geologic processes and features are not proposed in any of the alternatives. No major earthmoving or blasting activities are proposed that would impact the geologic processes or features or cause substantial alteration of the topography. Therefore this topic will not be further addressed in this document.

Prime and unique agricultural land. The soils and topography within Grand Canyon National Park are not conducive to agriculture. The soils in the vicinity of Grand Canyon Village tend to be shallow and poorly developed. No prime farmland or unique agricultural lands exist within the Park, and therefore, this topic will not be further addressed in this document.

Air Quality. Project construction would result in an increase in fugitive dust from soil exposure and disturbance. However, this effect would only occur during the construction period and would be localized and negligible. Water or dust control agents would be applied during construction as necessary to control dust.

The proposed activities would increase vehicle emissions from operating construction vehicles and hauling materials. However, the increased emissions be localized and would have an immeasurable effect on regional or local pollutant levels. Therefore, this topic will not be further addressed in this document.

Water Resources. The Grand Canyon Village area is characterized by the absence of surface water, which generally drains through the ground water system or returns to the atmosphere through evapotranspiration. Surface runoff usually only occurs following severe storm events. This is largely due to the permeable nature of the upper sedimentary layers underlying the Grand Canyon Village area (NPS 1995, Roundy and Vernon 1997) and the evapotranspiration potential of the surrounding pinyon-juniper community type (Huntoon n.d.).

Due to the evapotranspiration potential and high permeability of the underlying substrate, the proposed development would not measurably affect water quantity and timing of runoff. Despite the increase of impermeable surfaces created by the proposed development, the majority of water would continue to be lost through evapotranspiration or incorporated into the ground water system. Water entering the ground water system would be incorporated into the Cataract system (Huntoon, n.d.). Surface runoff from the project area would remain associated with severe storm events with the majority of it running off into the Cataract Creek watershed.

Ground and surface water quality would not be measurably affected by the proposed developments. Increased sedimentation from increased surface runoff and soil erosion would be minimal due to the lack of surface water runoff from the project area (except during severe storm events) and implementation of best management practices. In addition, the potential impacts of increased sedimentation would be limited to the period of construction and vegetation recovery.

This proposal would not likely affect water quantity, timing, or quality. Therefore, the water resource topic will not be further addressed in this document.

Floodplains. Executive Order 11988 requires federal agencies to examine potential risk and impacts of placing facilities within floodplains. Grand Canyon National Park Hydrologist John Rihs reviewed the project and determined that floodplains do not exist at any of the locations for the proposed emergency services facility. This determination is based on site specific knowledge of the Grand Canyon Village area, knowledge of hydrology, and professional judgement. None of the proposed sites are within any floodplains. Therefore, this topic will not be further addressed in this document.

Wetlands. Executive Order 11990 requires federal agencies to avoid impacts on wetlands where possible. Grand Canyon National Park Hydrologist John Rihs reviewed the project and determined that wetlands do not exist at any of the locations for the proposed emergency services facility. This determination is based on site specific knowledge of the Grand Canyon Village area, knowledge of wetlands, and professional judgement. No wetlands exist at any of the proposed sites. Therefore, this topic will not be further addressed in this document.

Threatened, Endangered, and Species of Concern – Plants. The U.S. Fish and Wildlife Service has determined that eight federally listed proposed, threatened, or endangered plant species may occur or have habitat in the Grand Canyon area. These species are:

Brady pincushion cactus (*Pediocactus bradyi*) – endangered.
Sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophyla*) – endangered.
Navajo sedge (*Carex specuicola*) – threatened.
San Francisco peaks groundsel (*Senecio franciscanus*) – threatened.

Siler pincushion cactus (*Pediocactus sileri*) – threatened.
Welshes milkweed (*Asclepias welshii*) – threatened.
Arizona bugbane (*Cimicifuga arizonica*) – candidate.
Fickeisen pincushion cactus (*Pediocacuts peeblesianus fickeiseniae*) – candidate.

In addition to the federally listed species, the NPS must consider state listed special status species. The Arizona Game and Fish Department has listed the following plant species for consideration for projects occurring on the South Rim.

Bigelow onion (*Allium bigelovii*) – salvage restricted.
Grand Canyon primrose (*Primula specuicola*) – salvage restricted.
Grand Canyon rose (*Rosa stellata abyssa*) – salvage restricted.
Mogollon columbine (*Aquilegia desertorum*) – salvage restricted.
Sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophyla*) – highly safeguarded.
Tusayan flame flower (*Talinum validulum*) – salvage restricted.
Western fairy slipper (*Calypso bulbosa*) – salvage restricted.

The proposed project was reviewed, and it was determined that habitat for the above federal and state listed species does not exist at any of the proposed locations for the emergency services facility. This determination is based on site specific knowledge of the Grand Canyon Village area, reconnaissance of the area, knowledge of the species in question, and professional judgement. There would be no effect on any of the federal or state listed plant species due to the fact they are not present. Therefore, this topic will not be further addressed in this document.

Terrestrial Habitat (General). The park supports a variety of terrestrial habitats including Rocky Mountain forest, Great Basin desert scrub and woodland, chaparral, mountain and desert grassland, Mohave desert scrub, and Sonoran desert scrub (Warren 1982). Despite the variety of terrestrial habitats, only ponderosa-pinyon-gambel oak-juniper habitat is present in the project area and only this habitat type will be evaluated in this EA.

Aquatic Habitat (General). Aquatic habitat is absent from the project area due to the lack of surface water. There would be no affect from the proposed project on aquatic communities. Therefore this topic will not be further addressed in this document.

Wildlife (General). Many resident and migratory species of wildlife inhabit the park, including 90 species of mammals, 290 species of birds, 60 species of reptiles and amphibians, and 25 species of fish (NPS 1995). Common mammals include mule deer, elk, coyote, gray fox, black-tailed jackrabbit, bobcat, striped skunk, ringtail, golden-mantled ground squirrel and several other rodent and bat species. Common resident bird species include the common raven, Steller's and pinyon jay, three nuthatch species, western bluebird, red-tailed hawk, several wren and sparrow species, northern flicker, and dark-eyed junco (NPS 1995).

Although several species of wildlife, particularly those associated with ponderosa-pinyon-gambel oak-juniper habitat, may reside in or near the project area, the actions evaluated in this EA would be undertaken in developed areas that support high visitation and vehicular traffic. Wildlife in the project area would be habituated to high levels of disturbance and human activity and would be

affected negligibly, if at all, by the actions proposed in this EA. Therefore this topic will not be further addressed in this document.

Visitor Experience. The proposed sites are located within administrative and highly developed areas of Grand Canyon Village. The proposed project would have no affect on visitor experience because the general visitor does not frequent administrative areas of the park. In addition, visual character would not be affected, despite the removal of some trees, because the proposed facility would blend into the highly modified and developed landscape.

Housing. None of the action alternatives would impact the availability of residential housing. Existing residential housing units near the proposed construction sites would remain. Therefore, impacts to residential housing will not be further addressed in this document.

Socioeconomic Environment. Socioeconomic values consist of local and regional businesses and residents, the local and regional economy, and park concessions. The local economy and most businesses in the surrounding communities are based on professional services, construction, tourist sales and services, and educational research. The regional economy is strongly influenced by tourist activity. The GMP EIS discussed the socioeconomic environment and impacts extensively.

Park businesses would not suffer any adverse short or long-term economic impacts from any of the alternatives because the proposal does not change visitor use levels or patterns. The short and long-term socioeconomic impacts of implementing any of the action alternatives would be consistent with the impacts described in the GMP EIS. Therefore, this topic will not be further addressed in this document.

Environmental Justice. Executive Order 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations. None of the proposed alternatives would have a disproportionately high and adverse effect on any minority or low-income population or community. Therefore, this topic will not be further addressed in this document.

Ethnographic Resources. Ethnographic resources are defined by the National Park Service as any "site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (*Cultural Resource Management Guideline* – DO-28: 191). The lands of Grand Canyon National Park are traditionally affiliated with the following Indian tribes: Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab-Paiute Tribe, Navajo Nation, Paiute Indian Tribe of Utah, Pueblo of Zuni, and San Juan Southern Paiute Tribe.

There are presently no known ethnographic resources in the areas of potential project effects. If the presence of ethnographic resources is subsequently identified in project locations through NPS consultation with affiliated tribes, the NPS would undertake appropriate measures to avoid these resources or to mitigate disturbances in further consultation with the tribes. As necessary, mitigation would be carried out in accordance with provisions of the Native American Graves Protection and Repatriation Act of 1990. The location of ethnographic sites would not be made public. Because no ethnographic resources are currently known to exist within the project areas, ethnographic resources was dismissed as an impact topic.

CHAPTER 2 - ALTERNATIVES

INTRODUCTION

This chapter describes a range of alternatives considered, including the "No Action" alternative, as required by the National Environmental Policy Act (NEPA). The alternatives described include mitigation measures proposed to minimize or avoid environmental impacts. In addition to fully describing a range of alternatives, this chapter describes alternatives considered early in the process but later eliminated from further study due to a variety of reasons. This chapter concludes with a comparison of alternatives through a summary of proposed actions and estimated impacts.

The descriptions of alternatives are based on preliminary designs and best information available at the time of this writing. Specific distances, areas, and layouts used to describe the alternatives are only estimates and could change during final site design. If changes during final site design are not consistent with the intent and effects of the selected alternative, then additional compliance would be needed as necessary.

ITEMS APPLICABLE TO ALL ACTION ALTERNATIVES

Building Design. All action alternatives met the following design criteria:

- Building designs meet American with Disabilities Act guidelines.
- Building designs meet Grand Canyon National Park's architectural guidelines.
- The apparatus room is column free.
- Service life for the building is 20 to 30 years.
- Design will allow for future expansion of the apparatus bays if needed.
- Building designs will accommodate the following functions:
  - -Apparatus storage for two fire engines, one ladder truck, two ambulances, and two rescue trucks.
  - -Storage areas for fire fighting equipment, SAR cache, EMS cache, audio-visual equipment, training supplies, office supplies, and miscellaneous equipment.
  - -Mechanical room for electrical, mechanical, communications network, and audio controls.
  - -Compressor room.
  - -Work shop with laundry room facilities, deep sink and space for special equipment, work benches, tool lockers, janitorial supplies, and storage bins.
  - -Office space for EMS, structural fire, and SAR personnel.
  - -Training room which will be convertible to an incident command post.
  - -Lobby.
  - -Men's and women's showers and restrooms.
  - -Break room and kitchen.

Location. All alternative site locations met the following location criteria:

- Site location will be close enough to Grand Canyon Village residential areas to allow for a maximum of 10 minute response time for volunteers.
- Adjacent roads will be able to accommodate the largest emergency response vehicle.
- Site will be large enough to allow for future expansion if needed.

General Construction Schedule. Construction for any of the action alternatives would take 12 to 18 months, starting in late spring 2002 or early summer 2002. However, construction could be delayed by weather conditions or other unexpected events.

MITIGATION MEASURES

Mitigation measures have been designed to minimize, reduce, or eliminate impacts of the proposed activities. The following mitigation measures apply to all action alternatives.

Soil Erosion. To minimize soil erosion, the following mitigation measures would be incorporated into all action alternatives.

- Standard erosion control measures such as silt fences, sand bags, or equivalent control methods would be used to minimize any potential soil erosion.
- Any revegetation effort for erosion control would use site adapted native seed and/or plants.

Air Quality. In order to minimize impact to local air quality, the following mitigation measures would be incorporated into all action alternatives.

- Water or dust control agents would be applied during construction as necessary to minimize dust.
- If an asphalt batch plant is needed, it would be propane-fired and the location would be park approved.

Water Quality. To minimize potential impacts to water quality, standard erosion control measures such as silt fences, sand bags, or equivalent control methods would be used to minimize any potential sediment delivery to streams.

Exotic Vegetation and Noxious Weeds – In order to prevent the introduction and minimize the spread of exotic vegetation and noxious weeds, the following mitigation measures would be incorporated into all action alternatives.

- All construction equipment would be pressure washed prior to entering the park.
- The staging area for construction equipment would be park approved and treated for exotic vegetation if necessary.
- Parking of vehicles would be limited to existing roads, parking lots, or the staging area.
- Any fill, rock, or additional topsoil needed would be obtained from a park approved source.
- All areas disturbed by construction would be revegetated using site adapted native seed and/or plants.
- All landscaping efforts would utilize native plants.
- Monitoring and follow-up treatment of exotic vegetation would occur for 2 to 3 years after construction is completed. Follow-up treatment could include mechanical, biological, chemical, or additional revegetation treatments in compliance with NPS Policies and Director's Orders.

Native Plant Restoration – In order to maximize restoration efforts after construction activities are finished,

- Topsoil from the site would be stockpiled for utilization during the restoration effort.
- Native vegetation would be salvaged and subsequently replanted in the disturbance area.

- Supplemental watering, weeding, and maintenance of restored plants would occur for three years after construction is complete.

California Condor. In order to protect the California condor, the following mitigation measure would be incorporated into all action alternatives.

- If a California condor visits the construction site, construction activities within 90 meters (300 feet) of the bird would cease until it leaves on its own or is scared off by park staff or Peregrine Fund personnel who are permitted to haze the birds.

Special Status Species – In order to protect any threatened, endangered, or special status species, the following mitigation measures would be incorporated into all action alternatives.

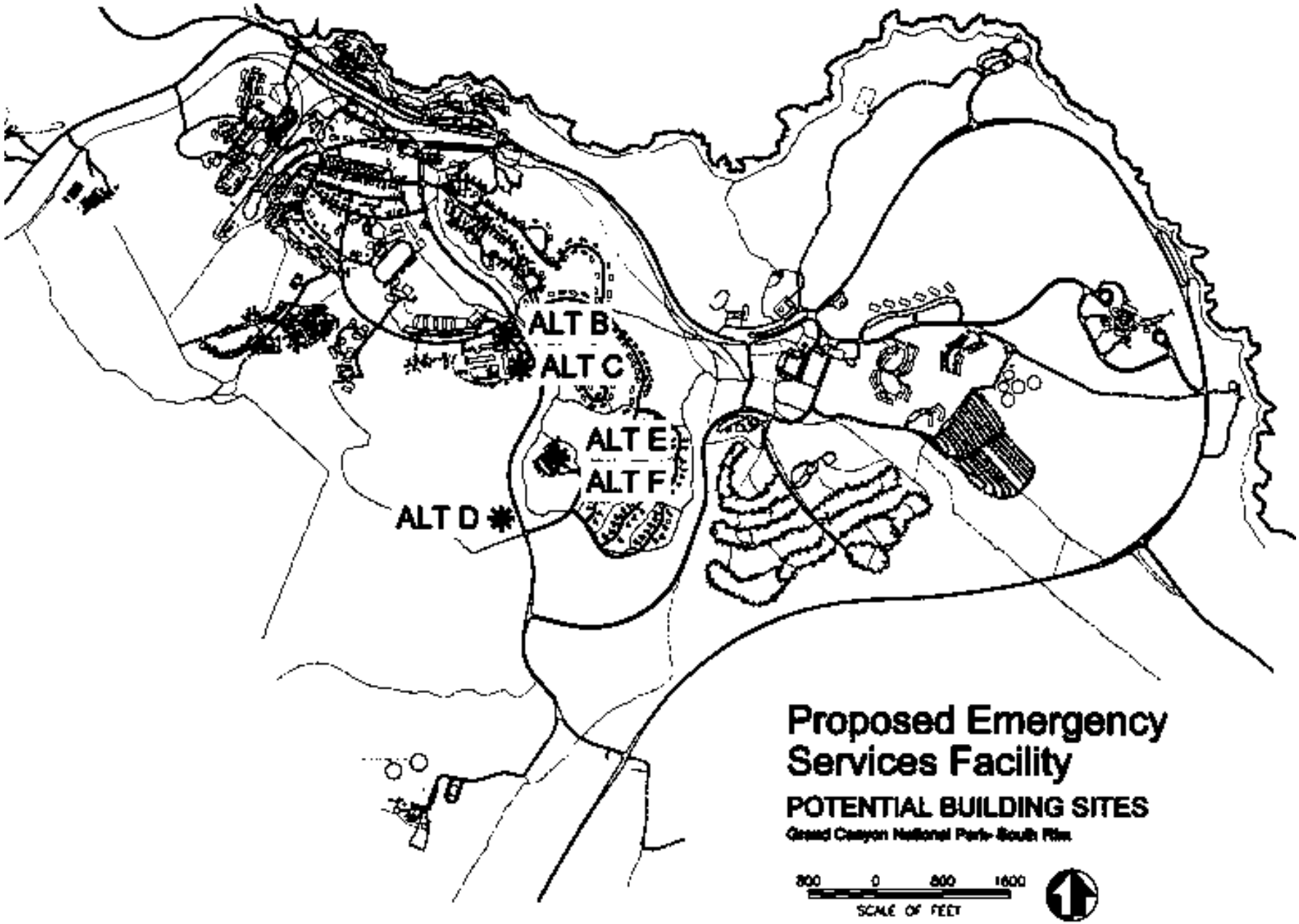
- The construction contract would include provisions for the discovery of any previously unknown or undiscovered threatened, endangered, or special status species. These provisions would require the cessation of construction activities until park staff evaluates the project impact on the discovery and would allow modification of the contract for any protection measures determined necessary to protect the discovery.
- Construction workers and supervisors would be informed about special status species and what actions should occur if a special status species is encountered.

Noise – In order to minimize disturbance to adjacent residents, construction activities would be limited to the daytime hours to limit noise impacts.

Cultural Resources – Should presently unidentified archeological resources be discovered during construction, work in that location would stop until the resources are properly recorded by an NPS archeologist and evaluated under the eligibility criteria of the National Register of Historic Places in consultation with the Arizona SHPO. If the resources are determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance (e.g. by data recovery excavations or other means) in accordance with the 1995 programmatic agreement among the NPS, the Arizona SHPO, and the Advisory Council on Historic Preservation regarding the draft General Management Plan/EIS for Grand Canyon National Park. In compliance with the Native American Graves Protection and Repatriation Act of 1990, the National Park Service would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary and sacred objects should these be discovered during the course of the project.

ALTERNATIVE A (No Action)

The no action alternative would maintain the existing condition at Grand Canyon Village and provides the baseline for comparison of the action alternatives. The existing situation of storing the majority of the emergency response vehicles at the NPS maintenance facility would continue. The two ambulances would continue to be stored outside and conflicts between emergency services personnel/equipment and maintenance personnel/equipment would remain at the NPS maintenance facility. Equipment for SAR and EMS would continue to be stored at multiple locations throughout Grand Canyon Village. Offices for emergency services would remain at the ranger operations building. Conditions which result in OSHA and NFPA violations would remain.


ALT B
ALT C
ALT E
ALT F
ALT D
Proposed Emergency Services Facility
POTENTIAL BUILDING SITES
Grand Canyon National Park- South Rim
800 0 800 1600
SCALE OF FEET

ALTERNATIVE B

This alternative proposes to construct a new emergency services building at a site located at the southwest corner of the Center Road and Albright Avenue intersection. Alternative B was referred to as Site 1 in the Site VA.

The following activities are included in this proposal:

- A total of about .7 hectares (1.7 acres) of largely undisturbed pinyon-juniper woodland would be cleared.
- Grading of the site would include about 1,453 cubic meters (1,900 cubic yards) of cut and 841 cubic meters (1,100 cubic yards) of fill.
- Utilities would be routed underground for about 61 meters (200 feet) from the existing NPS maintenance facility to the proposed site.
- A building of approximately 1,161 square meters (12,500 square feet) would be constructed.
- Approximately 3,001 square meters (32,300 square feet) would be paved to accommodate an entrance road, outlet road, concrete apron, and parking area for about 53 vehicles.
- Landscaping around the facility and disturbed areas would occur as necessary. This would include installation of signs, flagpole, and vegetation.
- Lapp Loop road (water truck hydrant access) would need to be relocated.

Mitigation Measures Specific to Alternative B

In addition to the mitigation measures listed for all action alternatives, the following mitigation measures would be implemented under this alternative.

Pre-treatment of exotic vegetation – To ensure existing populations of cheatgrass at this site do not expand, the site would be pre-treated through mechanical or chemical control methods. Pre-treatment would occur prior to any construction equipment arriving on site.

Alternative B
Emergency Services Facility
Site Selection Process
Grand Canyon National Park- South Rim
SCALE OF FEET
CENTER ROAD
ALBRIGHT AVENUE
APPARATUS FLOW
CONCRETE APRON
LAPP LOOP RD.
PAVED
Existing water filling station to be removed and relocated
Existing Maintenance Yard
Overflow/Remote parking to be built off of existing road
CONCRETE

ALTERNATIVE C

This alternative proposes to construct a new emergency services building at a site located immediately south of Site 1. This site is located between Center Road and the existing NPS maintenance facility in and around Lapp Loop Road. Alternative C was referred to as Site 2 in the Site VA.

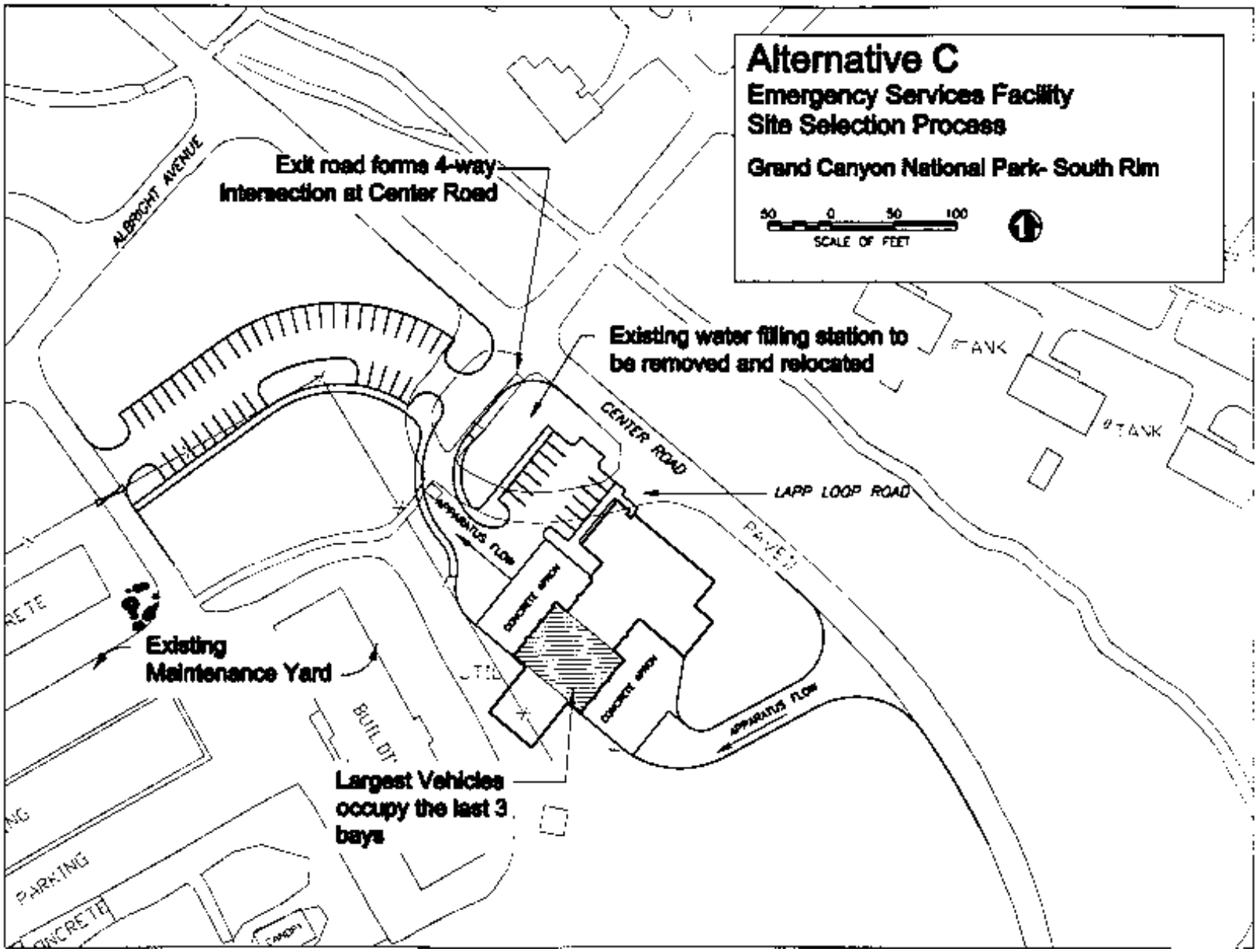
The following activities are included in this proposal:

- A total of about 1.1 hectares (2.6 acres) of largely undisturbed pinyon-juniper woodland would be cleared.
- Grading of the site would include about 1,234 cubic meters (1,614 cubic yards) of cut and 1,939 cubic meters (2,536 cubic yards) of fill.
- Utilities would be routed underground for about 61 meters (200 feet) from the existing NPS maintenance facility to the proposed site.
- A building of approximately 1,161 square meters (12,500 square feet) would be constructed.
- Approximately 4,554 square meters (49,023 square feet) would be paved to accommodate an entrance road, outlet road, concrete apron, and parking area for about 55 vehicles.
- Landscaping around the facility and disturbed areas would occur as necessary. This would include installation of signs, flagpole, and vegetation.
- Lapp Loop road (water truck hydrant access) would need to be relocated.

Mitigation Measures Specific to Alternative C

In addition to the mitigation measures listed for all action alternatives, the following mitigation measures would be implemented under this alternative.

Pre-treatment of exotic vegetation – To ensure existing populations of cheatgrass at this site do not expand, the site would be pre-treated through mechanical or chemical control methods. Pre-treatment would occur prior to any construction equipment arriving on site.

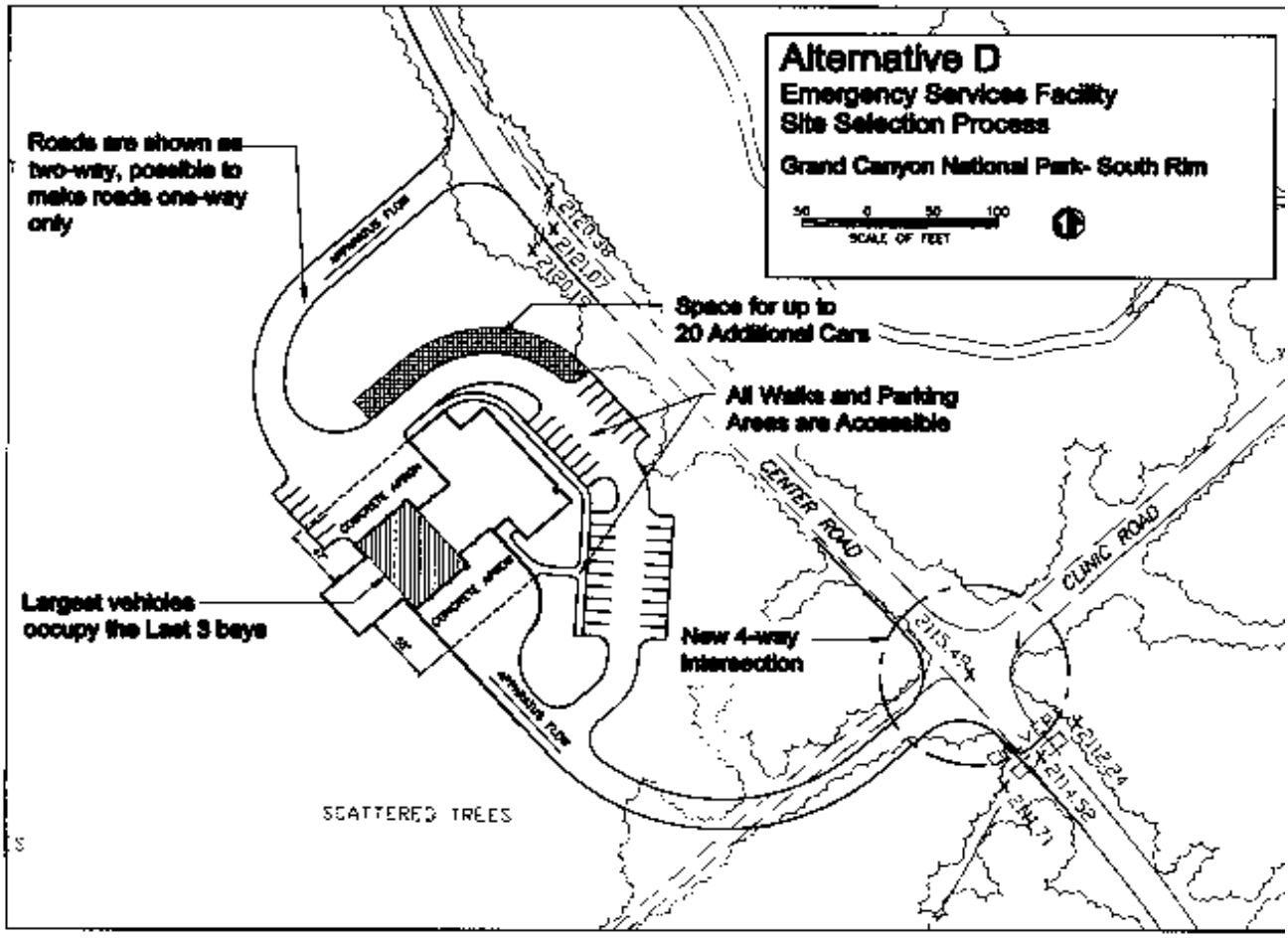

Alternative C
Emergency Services Facility
Site Selection Process
Grand Canyon National Park- South Rim
50 0 50 100
SCALE OF FEET
Exit road forms 4-way Intersection at Center Road
Existing water filling station to be removed and relocated
ALBRIGHT AVENUE
CENTER ROAD
LAPP LOOP ROAD
TANK
TANK
APPARATUS FLOW
CONCRETE APRON
CONCRETE APRON
APPARATUS FLOW
PAVED
Existing Maintenance Yard
BUILDING
Largest Vehicles occupy the last 3 bays
PARKING
CONCRETE

ALTERNATIVE D

This alternative proposes to construct a new emergency services building just west of Center Road and slightly north of Clinic Road. Alternative D was referred to as Site 3A in the Site VA.

The following activities are included in this proposal:

- A total of about 1.0 hectares (2.5 acres) of largely undisturbed pinyon-juniper woodland would be cleared.
- Grading of the site would include about 918 cubic meters (1,200 cubic yards) of cut and 1,652 cubic meters (2,160 cubic yards) of fill.
- Water and sewer utilities would be routed underground for about 91 meters (300 feet) from an area just south of the clinic to the proposed site. Telecommunications and electric utilities would be routed underground for about 427 meters (1,400 feet) from the clinic area to the proposed site.
- A building of approximately 1,161 square meters (12,500 square feet) would be constructed.
- Approximately 5,142 square meters (55,350 square feet) would be paved to accommodate an entrance road, outlet road, concrete apron, and parking area for about 40 vehicles. In addition to the paved parking area, an unpaved graded area adjacent to the parking area would be provided for overflow parking and accommodate about 20 vehicles.
- Landscaping around the facility and disturbed areas would occur as necessary. This would include installation of signs, flagpole, and vegetation.


Alternative D
Emergency Services Facility
Site Selection Process
Grand Canyon National Park- South Rim
SCALE OF FEET
Roads are shown as two-way, possible to make roads one-way only
Space for up to 20 Additional Cars
All Walks and Parking Areas are Accessible
Largest vehicles occupy the Last 3 bays
New 4-way Intersection
CENTER ROAD
CLINIC ROAD
SCATTERED TREES

ALTERNATIVE E

This alternative proposes to construct a new emergency services building northwest of the existing clinic complex. Alternative E was referred to as Site 1 in the Site VA and Option 1 in the Building VA.

The following activities are included in this proposal:

- One trailer (the "Science Center trailer") would be relocated under this alternative.
- A total of about .8 hectares (2 acres) of previously disturbed pinyon-juniper woodland would be cleared.
- Grading of the site would include about 355 cubic meters (465 cubic yards) of cut and 250 cubic meters (330 cubic yards) of fill.
- Utilities would be routed underground from the clinic building.
- A building of approximately 1,206 square meters (12,984 square feet) would be constructed.
- Approximately 1,120 square meters (12,060 square feet) would be paved and 1,618 square meters (17,415 square feet) would be repaved to accommodate a new connection road to Center Road, concrete apron, and parking area for about 62 vehicles.
- Landscaping around the facility and disturbed areas would occur as necessary. This would include installation of signs, flagpole, and vegetation.

Mitigation Measures Specific to Alternative E

In addition to the mitigation measures listed for all action alternatives, the following mitigation measures would be implemented under this alternative.

Pre-treatment of exotic vegetation – To ensure existing populations of Dalmatian toadflax and cheatgrass at this site do not expand, the site would be pre-treated through mechanical or chemical control methods. Pre-treatment would occur prior to any construction equipment arriving on site.

Archeological site protection – To protect archeological site B:16:263 from construction disturbance, snow fencing or a similar barrier would be temporarily placed to demarcate the limits of acceptable construction activity in the site vicinity.

Alternative E
Emergency Services Facility
Site Selection Process
Grand Canyon National Park- South Rim
SCALE OF FEET
Existing Clinic Building Approximately 20,000 SF
Footprint as shown includes entire building program
New road connection at Center Road, for emergency use only (two-way)
Expand existing parking lot
CENTER ROAD

ALTERNATIVE F - Preferred

This alternative proposes to construct a new building, link it to the existing clinic building, and adaptively reuse a portion of the clinic building for office space. Alternative F was referred to as Site 5 in the Site VA and Option 2 in the Building VA.

The following activities are included in this proposal:

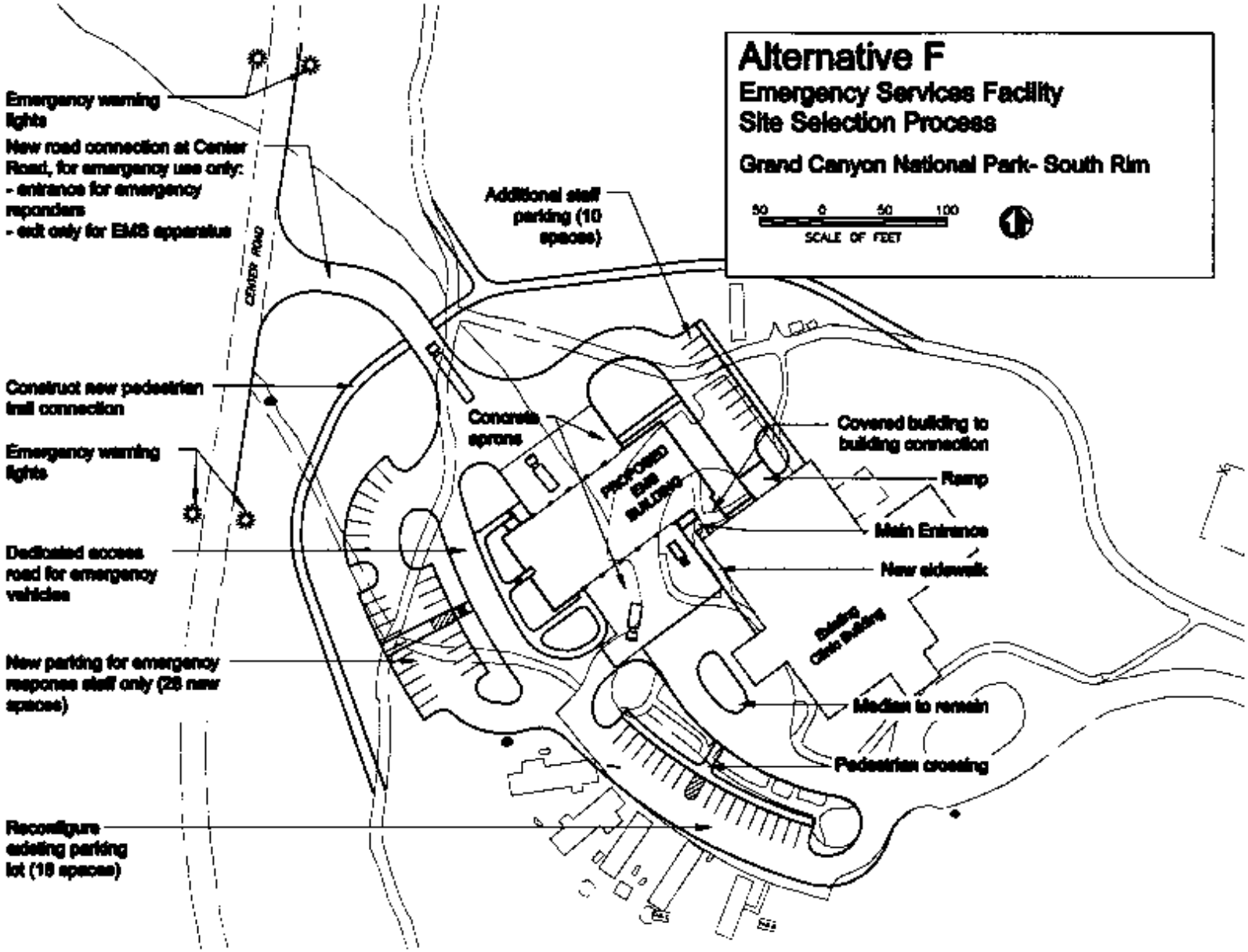
- One trailer (the "Science Center trailer") would be relocated under this alternative.
- A total of about .8 hectares (2 acres) of previously disturbed pinyon-juniper woodland would be cleared.
- Grading of the site would include about 355 cubic meters (465 cubic yards) of cut and 250 cubic meters (330 cubic yards) of fill.
- Utilities would be connected on site from the clinic building.
- Remodeling of the clinic building would occur, including the following activities:
    - ○ Comply with American with Disabilities Act requirements including removal and replacement sidewalks and doorways, and upgrading of restrooms.
    - ○ Repair and replacement of floors, windows, exterior signage, interior lighting fixtures, exterior lighting, HVAC system, and roof.
    - ○ Modification of existing floor plan to relocate various functions.
    - ○ Abatement of asbestos and lead as necessary.
    - ○ Painting, waterproofing, and masonry restoration.
- An addition to the clinic building of approximately 1,130 square meters (12,171 square feet) would be constructed.
- Approximately 3,975 square meters (42,800 square feet) would be paved and 2,044 square meters (22,000 square feet) would be repaved to accommodate a new connection road to Center Road, concrete apron, and parking area for about 62 vehicles.
- Landscaping around the facility and disturbed areas would occur as necessary. This would include installation of signs, flagpole, and vegetation.
- Installation of a traffic signal at the intersection of Center Road and the new access road to the emergency services building. This traffic signal would stop traffic to allow for safe crossing of Center Road for emergency services vehicles.

Mitigation Measures Specific to Alternative F

In addition to the mitigation measures listed for all action alternatives, the following mitigation measures would be implemented under this alternative.

Pre-treatment of exotic vegetation – To ensure existing populations of Dalmatian toadflax and cheatgrass at this site do not expand, the site would be pre-treated through mechanical or chemical control methods. Pre-treatment would occur prior to any construction equipment arriving on site.

Archeological site protection – To protect archeological site B:16:263 from construction disturbance, snow fencing or a similar barrier would be temporarily placed to demarcate the limits of acceptable construction activity in the site vicinity.


Alternative F
Emergency Services Facility
Site Selection Process
Grand Canyon National Park- South Rim
50 0 50 100
SCALE OF FEET
Emergency warning lights
New road connection at Center Road, for emergency use only:
- entrance for emergency responders
- exit only for EMS apparatus
Additional staff parking (10 spaces)
Construct new pedestrian trail connection
Emergency warning lights
Dedicated access road for emergency vehicles
New parking for emergency response staff only (28 new spaces)
Reconfigure existing parking lot (18 spaces)
Concrete apron
PROPOSED EMS BUILDING
Covered building to building connection
Ramp
Main Entrance
New sidewalk
Existing Clinic Building
Median to remain
Pedestrian crossing
CENTER ROAD

ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Several alternatives were considered throughout the planning process but eliminated from detailed study in this EA due to a variety of reasons. These alternatives were eliminated from further study after comprehensive reviews of the alternatives in context with the purpose and need for the action, location, building needs, and building criteria. The following briefly describes the alternatives and the reasons they were eliminated from detailed study.

GMP Site. The GMP identified the impound yard of the existing NPS maintenance facility as the proposed site for the new emergency services facility. This site was eliminated from further consideration because it would be too small and opportunities to expand would not be available in the future.

Recreation Center Building. The old recreation center building burned down in February 1994 and the vacant lot was initially considered as a possible location for the new emergency services facility. This site is located across Center Road from the ranger operations building and is within the Grand Canyon Village Historic District. This site was eliminated from further consideration because it would conflict with the historic district and the site would be too small. The building scale and nature of the emergency services operation would intrude on the district's historic character.

Old Service Station. The old service station site is located on the east side of the South Entrance Road and across from the Visitor Center and was initially considered as a possible location for the new emergency services facility. This site was eliminated from further consideration due to high response time, distance from high incident and hazard areas, and potential conflicts with having an emergency services facility in a crowded visitor use area. In addition, this site was eliminated because the portion of South Entrance Road between the visitor center and the junction of Desert View Drive is being considered for closure, which would limit the choices for response routes.

Rowe Well Road. A vacant area between the railroad tracks and the northern end of Rowe Well Road (the new mule barn site) was initially considered as a possible location for the new emergency services building. This site was eliminated from further consideration due to high response time, distance from residential areas (volunteers), and proximity to Bright Angel wash which has the potential to periodically flood.

Albright Avenue. A vacant area north of Albright Avenue and south of the school track was initially considered as a possible location for the new emergency services building. This site was eliminated from further consideration due to distance from main park arterials, narrow roadways, complicated circulation routes, and potential conflicts between children around the school campus and emergency response vehicles and vehicles of responding volunteers.

Value Analysis Site 3B. The Site VA considered constructing a new emergency services building at a site located just west of the junction of Clinic Road and Center Road. This alternative was eliminated from further consideration because extensive grading and retaining walls would be needed due to the steep topography and the presence of a steep wash immediately

southeast of the site. In addition, this site would limit design flexibility due to the small size and only one egress point to Center Road would be feasible.

Value Analysis Site 4. The Site VA considered constructing a new emergency services building at a site located on Shuttle Bus Road near the new NPS maintenance compound and helibase. This alternative was eliminated from further consideration because of the high response time, the highest response time of all the sites considered in the Site VA. In addition, this site conflicts with potential transit system corridors and does not currently have existing utilities close by which would result in greater utility costs and more disturbance to natural vegetation.

Value Analysis Site 6. The Site VA considered adaptively reusing an old building within the Grand Canyon Village Historic District as the emergency services building. This building is located in an area at the western end of Juniper Hill and Sunset Drive, which is known as the "historic NPS maintenance area". This alternative was eliminated from further consideration because of the potential negative impacts to the historic district. The building scale and nature of the emergency services operation would intrude on the district's historic character. In addition, this site would have limited parking, traffic flow would be more congested and complicated, extensive grading and retaining walls would be needed, and there could be potential conflicts with surrounding uses.

Asphalt. Emulsions or slow-cure cutback asphalt were considered to reduce impacts to air quality from emissions of volatile organic compounds (VOC). This mitigation was considered due to the rising ozone levels within the park. Currently ozone levels meet Environmental Protection Agency health standards, but they are closing in on the standard. However, due to availability of slow-cure cutback asphalt, distance to obtain it, feasibility problems with transporting asphalt long distances, and timing restrictions, this alternative was eliminated from further consideration.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and

- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Out of the action alternatives, Alternative F is the environmentally preferable alternative. This is due to the fact that Alternative F would be located in a highly disturbed site and would adaptively reuse an existing structure for a portion of the needed functions. This would reduce the footprint size and the amount of material needed to construct the facility.

COMPARISON OF ALTERNATIVES

The following section summarizes the alternatives by proposed activities and impacts. Table II-1 summarizes the proposed activities, which are described in detail under each alternative. Table II-2 summarizes the impacts of the alternatives by impact topics, which are described in detail in Chapter 4, Environmental Consequences.

Table II-1: Comparison of Proposed Activities

Proposed Activity	Alternatives					
	A	B	C	D	E	F
Area to be Cleared	0 ha	.7 ha (1.7 ac)	1.1 ha (2.6 ac)	1.0 ha (2.5 ac)	.8 ha (2.0 ac)	.8 ha (2.0 ac)
Grading Needed – Cut	0 m^3	1,453 m^3 (1,900 yd^3)	1,234 m^3 (1,614yd^3)	918 m^3 (1,200 yd^3)	153 m^3 (200 yd^3)	153 m^3 (200 yd^3)
Grading Needed – Fill	0 m^3	841 m^3 (1,100 yd^3)	1,939 m^3 (2,536 yd^3)	1,652 m^3 (2,160 yd^3)	1,835 m^3 (2,400 yd^3)	1,835 m^3 (2,400 yd^3)
New Construction	0 m^2	1,161 m^2 (12,500 ft^2)	1,161 m^2 (12,500 ft^2)	1,161 m^2 (12,500 ft^2)	1,206 m^2 (12,984 ft^2)	1,130 m^2 (12,171 ft^2)
Rehabilitation of Existing Building	0 m^2	0 m^2	0 m^2	0 m^2	0 m^2	377 m^2 (4,063 ft^2)
Area with New Pavement – parking, access road, and apron	0 m^2	3,001 m^2 (32,300 ft^2)	4,554 m^2 (49,023 ft^2)	5,142 m^2 (55,350 ft^2)	1,120 m^2 (12,060 ft^2)	3,975 m^2 (42,800 ft^2)
Area to be Repaved – parking, access road, and apron	0 m^2	0 m^2	0 m^2	0 m^2	1,618 m^2 (17,415 ft^2)	2,044 m^2 (22,000 ft^2)
Parking Spaces Provided	0	53	55	40 with 20 overflow	62	62

Table II-2: Comparison of Impacts

Impact Topic	Alternatives					
	A	B	C	D	E	F
Soils: displacement – amount of cut and fill combined	0	2,294 m^3 3,000 yd^3	3,173 m^3 4,150 yd^3	2,570 m^3 3,360 yd^3	605 m^3 785 yd^3	605 m^3 785 yd^3
Ponderosa-Pinyon-Gambel Oak-Juniper Habitat: amount to be removed	N/A	.7 ha (1.7 ac)	1.1 ha (2.6 ac)	1.0 ha (2.5 ac)	.8 ha (2.0 ac)	.8 ha (2.0 ac)
Exotic Vegetation: Indicator of Spread – number of exotic species at the site	N/A	1	1	0	2	2
Exotic Vegetation: Indicator of Introduction – amount of disturbance	N/A	.7 ha (1.7 ac)	1.1 ha (2.6 ac)	1.0 ha (2.5 ac)	.8 ha (2.0 ac)	.8 ha (2.0 ac)
Threatened, Endangered, & Special Status Species – Wildlife - number of species with no effect determination	12	11	11	11	11	11
Threatened, Endangered, & Special Status Species – Wildlife - number of species with may affect, not likely to adversely affect determination	0	1*	1*	1*	1*	1*
Threatened, Endangered, & Special Status Species – Wildlife - number of species with may affect, likely to adversely affect determination	0	0	0	0	0	0
Traffic Flow – Center Road and project area	No Impacts	Short-term Minor Adverse	Short-term Minor Adverse	Short-term Negligible Adverse	Short-term Minor to Moderate Adverse	Short-term Minor to Moderate Adverse
Cultural Resources – Archeological resources; Historic district/structures; and Cultural landscape features (e.g. Center Road).	No Impacts	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts
Cultural Resources – "Mission 66" structures	No Impacts	N/A	N/A	N/A	No Adverse Impacts	No Adverse Impacts

N/A = not applicable
* = This species is the California condor

CHAPTER 3 - AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the existing environment and provides the baseline for comparison of the alternatives. This chapter describes the resources that could be affected (impact topics) by the implementation of any of the proposed alternatives.

Grand Canyon National Park encompasses 1.2 million acres in northern Arizona. The proposed project is located at Grand Canyon Village, which is along the South Rim of the Grand Canyon about 10 kilometers (6 miles) north of Tusayan, Arizona. Grand Canyon Village serves as the south entrance to the park and is the first park development south entrance visitors encounter. It is a destination point for many Grand Canyon visitors and provides many services such as lodging, restaurants, post office, bank, gift shops taverns, entertainment, and orientation.

SOILS

Grand Canyon Village is on the Coconino Plateau, which is capped by the Kaibab Formation. The Kaibab Formation is a Permian age marine deposit and consists of the Harrisburg and the Fossil Mountain member. In the vicinity of the south rim, the Kaibab Formation consists of sandstones, redbeds, chert, dolomite and some limestone (NRCS 2000). Soils tend to be shallow, poorly developed, and stable (NPS 1995). Soils derived from the Kaibab Formation are generally characterized by high infiltration capacity, low moisture holding capacity, and low soil fertility (Roundy 1996).

PONDEROSA-PINYON-GAMBEL OAK-JUNIPER HABITAT

This habitat type is found on level to gently sloping terrain of all aspects and is a transition from pinyon-juniper habitat at the lower elevations to the pure ponderosa pine forest at the higher elevations or sites with moister and deeper soils. Associated species with this habitat type include big sagebrush (*Artemisia tridentata*), bluegrass (*Poa pratensis*), lupine (*Lupinus hillii*), banana yucca (*Yucca baccata*), cliff-rose (*Cowania mexicana*), creeping mahonia (*Berberis repens*), and snowberry (*Symphoricarpos spp*.).

EXOTIC VEGETATION AND NOXIOUS WEEDS

Almost 150 exotic plant species are known to exist in the South Rim area of Grand Canyon National Park. Of these approximately 150 exotic plant species, ten are listed on Arizona's noxious weed list. These species and Arizona State status are:

Chondrilla juncea - rush skeletonweed - prohibited,
Aegilops cylindrica - jointed goatgrass - restricted,
Alhagi camelorum - camelthorn - restricted,
Cardiara draba - white top - restricted,
Centaurea maculosa - spotted knapweed - restricted,
Linaria dalmatica - Dalmatian toadflax - restricted,

Onopardum acenthium - scotch thistle - restricted,
Cenchrus incertus - field sandbur - regulated,
Convolvulus arvensis - field bindweed - regulated,
Tribulus terrestris - puncture vine - regulated.

Within Grand Canyon Village, the species of highest concern based on relative abundance, potential spread, and potential impact are:
Acroptilon repens – Russian knapweed,
Cardaria draba – whitetop, hoary cress,
Conium maculatum – poison hemlock
Linaria dalmatica – Dalmatian toadflax, and
Onopardum acanthium – scotch thistle.

In addition, there are 23 other species of high concern at Grand Canyon Village based on relative abundance, potential spread, and potential impact. The proposed sites for the emergency services facility are relatively free of existing exotic vegetation. Sites for Alternatives B and C only have cheatgrass, and the site for Alternatives E and F only has cheatgrass and Dalmatian toadflax

Cheatgrass (*Bromus tectorum*) is an annual grass from southwestern Asia. It occurs throughout most of the United States (Mosley et al. 1999) and is very persistent. Cheatgrass is a species of high concern for the Grand Canyon Village area because it is currently not abundant in this area, difficult to eradicate once it is established, a prolific seed producer, and a colonizer of drier sites such as those at Grand Canyon.

Dalmatian toadflax (*Linaria dalmatica*) is a herbaceous perennial from the Mediterranean region. It is considered a noxious weed in the United States and is associated with disturbed, open habitats (Lajeunesse, 1999). Dalmation toadflax is a species of high concern for the Grand Canyon Village area because considerable effort has been expended to reduce the abundance of it in the area, it is difficult to eradicate once established, it is a prolific seed producer, and it is a highly competitive plant.

THREATENED, ENDANGERED, AND SPECIES OF CONCERN – WILDLIFE

The U.S. Fish and Wildlife Service has listed ten species as proposed, threatened, or endangered wildlife species that may occur or have habitat in the Grand Canyon area. These species are:

Black-footed ferret (*Mustela nigripes*) – endangered.
California condor (*Gymnops californianus*) – endangered, experimental/nonessential.
Humpback chub (*Gila cypha*) – endangered.
Kanab ambersnail (*Oxyloma haydeni kanabensis*) – endangered.
Razorback sucker (*Xyrauchen texanus*) – endangered.
Southwestern willow flycatcher (*Empidonax traillii extimus*) – endangered.
Little Colorado spinedace (*Lepidomeda vittata*) – threatened.
Mexican spotted owl (*Strix occidentalis lucida*) – threatened, designated critical habitat.
Bald eagle (*Haliaeetus leucocephalus*) – threatened, proposed delisting.
Chiricahua leopard frog (*Rana chiricahuensis*) – candidate.

In addition the Arizona Game and Fish Department has listed the following wildlife species for consideration for projects occurring on the South Rim.

American peregrine falcon (*Falco peregrinus anatum*) – wildlife of special concern.
Humpback chub (*Gila cypha*) – wildlife of special concern.
Mexican spotted owl (*Strix occidentalis lucida*) – wildlife of special concern.
Northern goshawk (*Acipiter gentilis*) – wildlife of special concern.
Southwestern willow flycatcher (*Empidonax traillii extimus*) - wildlife of special concern.
Western red bat (*Lasiurus blossevillii*) – wildlife of special concern.

Habitat for all of the above federal and state listed species, except for California condor and northern goshawk, do not exist at or near any of the proposed locations for the emergency services building. Humpback chub, razorback sucker and Little Colorado spinedace occur in perennial streams and rivers. The Chiricahua leopard frog requires perennial sources of waters including rivers, streams, ponds, etc. No perennial rivers, streams, ponds, etc occur at or near any of the proposed sites for the emergency services building. Kanab ambersnail, southwestern willow flycatcher and western red bat occur in wetland or riparian habitats. No wetland or riparian habitats occur at or near any of the proposed emergency services facility sites. Bald eagle and American peregrine falcon utilize large trees or cliffs near water. Again, no surface water occurs at or near any of the proposed sites. In addition, the closest cliff habitat occurs below the rim, which is greater than .3 kilometers (1/2 mile) from any of the proposed sites.

Black-footed ferrets occur in grassland prairie habitat in association with prairie dog colonies. None of the proposed sites occur in this type of habitat and there are no prairie dog colonies within Grand Canyon National Park.

All of the proposed construction sites are within pinyon-juniper habitat which is not considered designated critical habitat for Mexican spotted owl (USFWS 2000). In addition, the pinyon-juniper habitat at and adjacent to the proposed construction sites do not have any of the primary constituent elements for critical habitat. There are no known Mexican spotted owl nest sites in the vicinity of Grand Canyon Village. In addition, it is unlikely Mexican spotted owl would ever utilize the habitat at or near the proposed sites due to high disturbance levels from urban development and human habitation.

The northern goshawk typically occurs in mature or old growth forests. They generally nest in large trees to accommodate their bulky nests. The pinyon and juniper trees in and around the proposed sites are not conducive to northern goshawk nesting. There are no known northern goshawk nest sites in the vicinity of Grand Canyon Village. In addition, it is unlikely northern goshawk would utilize the habitat at or near the proposed sites due to high disturbance levels from urban development and human habitation.

California Condor

The California condor (*Gymnops californianus*) was listed as an endangered species in March 1967 and remains classified as endangered today. In 1996, the U.S. Fish and Wildlife Service established a nonessential, experimental population of California condors in Northern Arizona. In December 1996 the first condors were released in the Vermilion Cliffs area of Coconino

County, Arizona, approximately 48 kilometers (30 miles) north of Grand Canyon National Park. Subsequent releases have occurred in May 1997, November 1997, November 1998, and December 1999 in the same vicinity and Hurricane Cliff area, which is about 60 miles west of Vermilion Cliffs. By declaring the population "experimental, nonessential", the U.S. Fish and Wildlife Service can treat this population as "threatened" and develop regulations for management of the population that are less restrictive than mandatory prohibitions covering endangered species. This facilitates efforts to return the condor to the wild by providing increased opportunities to minimize conflict between the management of the condors with other activities. Within Grand Canyon National Park, the condor has the full protection of a threatened species (NPS 1991).

All of the experimental, nonessential population of California condors in Northern Arizona are fitted with radios allowing field biologists to monitor their movements. During 1999, the condors have been observed as far west as the Virgin Mountains near Mesquite, Nevada; south to the San Francisco peaks outside of Flagstaff, Arizona; north to Zion and Bryce Canyon National Parks and beyond to Minersville, Utah; and east to Mesa Verde, Colorado and the Four Corners region (Peregrine Fund 2000). Monitoring data indicate condors are using habitat throughout Grand Canyon National Park, with concentration areas in Marble Canyon, Desert View to the Village on the South Rim, and the Village to Hermits Rest.

Nesting habitat for California condor includes various types of rock formations such as crevices, overhung ledges, and potholes. Potential nesting habitat exists near the Grand Canyon Village below the rim; however, no nest sites are known to occur in the vicinity of project area. Most California condor foraging occurs in open terrain. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. Roost sites include cliffs and tall trees, including dead trees (snags) (Fish and Wildlife Service 1996).

TRAFFIC FLOW

All action alternatives propose to construct the emergency services facility in close proximity to or adjacent to Center road, which is a main throughfare at Grand Canyon Village. Center Road is the most direct route to the Village, however South Entrance Road is currently the primary access route for visitors to the Village because most visitors are unaware of the short cut (BRW, 2000). Traffic volumes peak twice daily with the highest volume of inbound traffic occurring between 10 and 11 AM, when most day users are entering the park. The heaviest outbound peak occurs from 3 to 4 PM when overnight guests are arriving and the day users are departing (BRW, 2000).

As visitors travel inbound on Center Road from South Entrance Road, they will first encounter the Shuttle Bus Road intersection about 285 meters (940 feet) from South Entrance Road. Only administrative traffic utilizes Shuttle Bus Road to access the new NPS maintenance building, shuttle bus compound, bulk fuel storage facility, and the fire and aviation facilities. Visitors then will travel about 410 meters (1,340 feet) before encountering the Market Plaza Road intersection. The majority of visitors will turn onto Market Plaza Road to access Mather Campground, Trailer Village, the General Store, Post Office, bank, Yavapai Lodge, and Park Headquarters. From the Market Plaza Road intersection, visitors will travel about 300 meters (985 feet) along Center Road before encountering the Clinic Road intersection. Clinic Road accesses the clinic and an

employee housing area, and most visitors would bypass this road. From Clinic Road visitors would travel about 750 meters (2,455 feet) before encountering Park Circle, which accesses employee housing, on the right and Lapp Loop Road on the left. From Lapp Loop Road the Albright Avenue intersection is encountered about 90 meters (290 feet) further. Albright Avenue accesses the Albright Training Center, existing NPS maintenance facility, and employee housing. From Albright Avenue, visitors will travel 520 meters (1,710 feet) along Center Road before reaching the Boulder Road intersection, which accesses the school and employee housing. Visitors will travel from the Boulder Road intersection to Village Loop for about 240 meters (790 feet) at which point Center Road terminates.

CULTURAL RESOURCES

Grand Canyon Village Historic District – The Grand Canyon Village Historic District is recognized for exceptional significance as a National Historic Landmark (NHL), encompassing an extensive assemblage of 269 buildings and structures, 42 landscape structures and 3 sites. Historic resources contributing to the district's significance span the period of significance from 1898 to 1941, associated with early tourism development at the South Rim, and subsequent National Park Service expansion of the developed area. The arrival in 1901 of the Santa Fe Railway and its subsidiary, the Fred Harvey Company, provided the impetus for substantial tourist-related construction in the area prior to establishment of Grand Canyon National Park in 1919. The district retains a high degree of integrity reflecting the 1924 NPS master plan for the village; the original street plan, organization of developed areas, natural and constructed landscaping, and overall setting remain largely intact (NPS, 1995).

Most of the district's structures date from the 1930s, constructed in the prevailing rustic style that incorporated native building materials, primarily wood and stone. Four early district structures built in the "Craftsman Rustic" and "NPS Rustic" styles are designated individually as National Historic Landmarks: El Tovar Hotel (1905), Grand Canyon Railway Depot (1910), Grand Canyon Powerhouse (1926), and Grand Canyon Park Operations Building (1929). Two additional NHL's, Hopi House (1905) and Lookout Studio (1914), were built by the Santa Fe Railway and designed by renowned architect Mary Jane Colter in her own distinctive rustic style. While located within the Grand Canyon Village Historic District, Hopi House and Lookout Studio are also grouped thematically in the Mary Jane Colter NHL Historic District together with Hermits Rest and Desert View Watchtower, two other Colter-designed buildings.

Center Road represents a portion of the original South Entrance Road alignment, constructed in 1927-28 to accommodate the park's growing number of motoring tourists. Designed by the Bureau of Public Roads, it was the first road built to automotive standards in the park, and for nearly 30 years served as the principal southern entrance route. In 1953-54, the present South Entrance Road was constructed as a replacement to handle increased vehicle volumes, and the old alignment (then designated Center Road) served as a service road for NPS and Fred Harvey Co. employees stationed at Grand Canyon Village (NPS, 1997). Center Road is identified as a cultural landscape structure contributing to the NHL significance of the Grand Canyon Village Historic District. With the exception of a 3.3 mile dirt segment extending from Shuttle Bus Road to the south park boundary, the Arizona state historic preservation officer (SHPO) has indicated that the 1.4 mile portion of Center Road extending from the present historic district boundary to

Shuttle Bus Road should also be considered potentially eligible for district inclusion (memo from James Garrison, Az. SHPO, to Doug Brown, GRCA Compliance Coordinator, July 23, 1998).

Archeological Resources – The earliest archeological evidence of human activity in the Grand Canyon Village area dates from the Late Archaic cultural period (ca. 2600 – 300 BC). Throughout the Grand Canyon, the presence of mobile groups of Archaic period hunter-gatherers is identified by such remains as isolated projectile points, rock art, rock shelters, lithic scatters, and camp sites.

Ancestral Puebloan people (Kayenta Anasazi) later settled along the inner Canyon and on the North and South rims. Between approximately AD 800-1000 (the Pueblo I period) and AD 1000-1150 (the Pueblo II period), these people adopted an increasingly sedentary and agriculturally centered culture, capable of supporting large population densities. Ancestral Puebloan sites include pithouses, above-ground masonry structures and storage facilities, and agricultural features. Most of the Puebloan people abandoned the canyon sometime after AD 1170, with only remnant populations remaining.

Cohonina people were also present in the Grand Canyon at approximately the same time as their Puebloan neighbors, and archeological evidence of their activities has also been found in the Grand Canyon Village area. While archeological information regarding Cohonina activities in the Canyon is currently limited, mounting evidence suggests that they possessed a complex culture that involved foraging in the Grand Canyon region during the summer, and wintering in pithouses near Mt. Sitgreaves.

Historic period Havasupai camps have also been identified in the Grand Canyon Village area. Up until the late 19th century, the Havasupai traditionally spent their winters on the plateau of the South Rim, relocating below the rim to Cataract (Havasu) Canyon during the spring and summer months to grow crops. Historical records indicate that the Navajo and Hopi also made use of the area for subsistence and religious purposes.

Trash dumps associated with historic period tourism development activities have also been identified throughout the area. These dumps may contain cultural material expanding understanding of tourism activities and construction/transportation development during the early part of the 20th century.

Previous archeological surveys have been conducted along the Center Road corridor that cover the present alternative project locations. A prehistoric site (B:16:263) is located within 75 to 90 feet south of the clinic building's parking lot. The site consists of a scatter of ceramic sherds ("Tusayan Gray Ware", "Tusayan White Ware", and "Deadman's Gray"), and lithic material (a worked flake of Kaibab chert was found along with other thinning flakes). Although located within the area of potential project impacts under Alternatives E and F, the site would be avoided by the temporary placement of snow fencing or other measures to mark the acceptable limits of construction in the site vicinity. Other prehistoric sites (e.g. B:16:184 and B:16:559) are recorded in the general area but are outside the area of potential project impacts (GRCA archeological site files).

"Mission 66" Structures – The existing clinic building, located along Center Road south of Grand Canyon Village, was constructed in 1967 during the latter stages of the National Park Service's design and construction initiative known as "Mission 66." Breaking with the emphasis on rustic design that had previously characterized NPS architecture, Mission 66 designers incorporated modern building materials and design elements into new visitor centers and other buildings. Among the distinctive features of the Mission 66 style were flat or gently pitched roofs, concrete and prefabricated components, large plate-glass windows, and open interior spaces.

The exterior of the one-story, flat-roofed clinic building exhibits straight-sided, angular planes. It incorporates concrete block walls, with stucco finishing around the doors, windows and columns. A distinctive design element is a 4 ft.-wide precast concrete fascia with a metal cap that encircles the building at the roof line.

The Arizona State Historic Preservation Office has indicated that the clinic does not appear to be eligible for the National Register of Historic Places [memo from Robert Frankeberger (Az. SHPO), to Joanne Wilkins (Grand Canyon NP), 8/8/2000]. Nevertheless, NPS project designers have strived to preserve the architectural character of the existing clinic in developing adaptive use designs for the new EMS building. The materials and design detailing for new construction would be architecturally compatible with the clinic.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the proposed action be implemented. This section analyzes the environmental consequences of the alternatives on the impact topics. This analysis provides the basis for comparing the alternatives.

METHODOLOGY

The impact analysis and conclusions were based on park staff knowledge of the resources and site; review of existing literature and park studies; information provided by experts within the National Park Service and other agencies; and professional judgement.

Cumulative Impact

Cumulative impact is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Therefore it is necessary to identify other ongoing or foreseeable future actions within the vicinity of Grand Canyon Village. For this analysis, foreseeable future actions were considered to be actions that could occur in the vicinity of Grand Canyon Village within the next five years which currently have funding or funding is actively being sought. Five years was selected as the time frame for foreseeable future actions because most of the direct and indirect impacts of the proposal would occur within five years.

The largest foreseeable future action that could occur in the vicinity of Grand Canyon Village is the implementation of a transit system from Tusayan to Mather Point, with a spur into the village. This project was identified in the GMP. Alternative transportation systems being evaluated include light rail, buses on a dedicated roadway, and conventional buses on shared roads. Planning and environmental documentation are ongoing for this project, and implementation could occur within the next five years.

Other foreseeable future actions that involve new construction include the Horace Albright Training Center, NPS maintenance facility, mule barn, greenway, back country permits office, learning center housing, Grand Canyon Village restrooms, and Pinyon Park housing. Foreseeable future actions that involve rehabilitation of existing facilities include Grand Canyon Village restrooms, walkways, Ranger Operations building, Yavapai observation station, and visitor center/park headquarters. Foreseeable future actions that involve the rehabilitation and reuse of existing facilities include the development of the Heritage Education Campus in the powerhouse area of the historic district and the development of a bike rental facility. See Appendix B for a short description of each of the foreseeable future actions.

SOILS

Methodology. For the purpose of the impact analysis for soils, the following definitions for intensity and duration are used to characterize the impacts.

Intensity. Intensity of impact is discussed in context of the Grand Canyon Village and is defined as follows:

Negligible – impact to the soil resource is barely perceptible or not measurable, and confined to a very small area.

Minor – impact to the soil resource is perceptible or measurable, and it is localized.

Moderate – impact is clearly detectable and could have appreciable effect on the soil resource.

Major – impact would have a substantial, highly noticeable influence on the soil resource.

Duration. Duration of the impacts is defined as follows:

Short-term – impacts that would be less than about 5 years duration. Five years was selected as the difference between short and long term due to the length of construction (1-2 years) plus the length of revegetation and post-treatment (2-3 years).

Long-term – impacts that would be about 5 years or more in duration.

Alternative A - No Action

Direct/Indirect Impacts. This alternative would not implement any ground disturbing activities and thus there would be no impacts to the soil resource.

Cumulative Impacts. Alternative A would not contribute to cumulative effects. However, proposed foreseeable future developments would adversely impact the soil resource through compaction and displacement for transportation corridors, buildings, hardened surfaces, and managed landscapes.

Conclusion. Implementing this alternative would have no impact to the soil resource.

All Action Alternatives

All action alternatives would have about the same impact on the soil resource because the only difference between the action alternatives, in terms of impacts to soils, is the amount of disturbance to the soil resource. The minor difference in the amount of disturbance required would not change the overall impacts to the soil resource. Therefore the impacts of the action alternatives on soils will be addressed together

Direct/Indirect Impacts. Implementing any of the action alternatives would impact the soil resource through compaction and soil displacement. Soil properties affected by compaction include soil porosity, water infiltration rates, water holding capacity, and aeration of soils. The

differences in the action alternatives for potential soil compaction are related to the area of disturbance. Alternative B would disturb about .7 hectares (1.7 acres); Alternative C would disturb about 1.1 hectare (2.6 acres); Alternative D would disturb about 1.0 hectares (2.5 acres); and Alternatives E and F would both disturb about .8 hectares (2 acres). The greater area of disturbance, the greater the potential for compaction. However, impacts from compaction would be negligible due to the shallow, coarse, and stony nature of the soils along the South Rim. In addition, surface runoff rates and soil loss due to erosion would be negligible due to the stockpiling of topsoil during construction, implementation of best management practices, and lack of surface runoff due to evapotranspiration and high permeability of the underlying substrate.

Adverse impacts associated with displacement include removal of the nutrient surface layer and soil profile disruption. The majority of soil displacement would occur to prepare the site for construction. Alternative C would displace the most soil by cutting about 1,234 cubic meters (1,614 cubic yards) and filling about 1,939 cubic meters (2,536 cubic yards) of material. Alternatives E and F would displace the least soil by cutting about 355 cubic meters (455 cubic yards) and filling about 250 cubic meters (330 cubic yards) of material. Alternative B would require 1,453 cubic meters (1,900 cubic yards) of cut and 841 cubic meters (1,100 cubic yards) of fill, and Alternative D would require 918 cubic meters (1,200 cubic yards) of cut and 1,652 cubic meters (2,160 cubic yards) of fill. The impacts to the soil resource from implementing Alternative B would be considered to be long-term, minor, adverse impacts mainly due to displacement.

Cumulative Impacts. The combined impact of this proposal with past, present, and foreseeable future actions would be the continued compaction and displacement of soils from construction and development projects. Compaction would be limited in intensity due to the shallow, coarse, and stony nature of the soils along the South Rim. Displacement from soil erosion would probably be the impact of greatest concern due to soil exposure created during construction. However, soil loss would be minimized through implementation of standard erosion control measures. The cumulative impact of implementing any of the proposed action would be a long-term, minor to moderate, adverse impact. However, the adverse impacts from the proposed action would be a relatively minor component of the overall cumulative impact.

Conclusion. Implementing any of the action alternatives would result in a long-term, minor, adverse impact mainly due to soil displacement.

PONDEROSA-PINYON-GAMBEL OAK-JUNIPER HABITAT

Methodology. For the purpose of the impact analysis for this habitat type, the following definitions for intensity and duration are used to characterize the impacts.

Intensity. Intensity of impact is discussed in context of the Grand Canyon Village and is defined as follows:

Negligible – impact to this habitat type is barely perceptible or not measurable, and confined to a very small area.

Minor – impact to this habitat type is perceptible or measurable, and it is localized.

Moderate – impact is clearly detectable and could have appreciable effect on this habitat type.

Major – impact would have a substantial, highly noticeable influence on this habitat type.

Duration. Duration of the impacts is defined as follows:

Short-term – impacts that would be less than about 5 years duration. Five years was selected as the difference between short and long term due to the length of construction (1-2 years) plus the length of revegetation and post-treatment (2-3 years).

Long-term – impacts that would be about 5 years or more in duration.

Alternative A - No Action

Direct/Indirect Impacts. This alternative would not implement any ground disturbing activities and thus there would be no impacts to ponderosa-pinyon-gambel oak-juniper habitat. No vegetation, including trees and shrubs, would be removed or otherwise damaged, and no additional vegetation would be planted.

Cumulative Impacts. Alternative A would not contribute to cumulative effects. However, proposed foreseeable future developments would destroy minor amounts of this habitat type for transportation corridors, buildings, hardened surfaces, and managed landscapes.

Conclusion. Implementing this alternative would have no impact to ponderosa-pinyon-gambel oak-juniper habitat.

All Action Alternatives

All action alternatives would have about the same impact on ponderosa-pinyon-gambel oak-juniper habitat because the only difference between the action alternatives, in terms of impacts to this habitat type, is the amount of clearing required for each alternative. The minor difference in the amount of clearing required would not change the overall impacts to this habitat type. Therefore the impacts of the action alternatives on this habitat type will be addressed together.

Direct/Indirect Impacts. Alternative B would require about .7 hectares (1.7 acres) of clearing; Alternative C would require 1.1 hectares (2.6 acres) of clearing; Alternative D would require about 1.0 hectares (2.5 acres); and Alternatives E and F would require .8 hectares (2.0 acres) of clearing. The clearing of this habitat would constitute a loss of ponderosa-pinyon-gambel oak-juniper habitat. In addition, removal of this habitat would disturb adjacent habitat and reduce nutrient capital stored in the removed biomass. Despite the increased disturbance and lost nutrient capital, the overall function of this habitat type in context of the Grand Canyon Village would negligibly change because this habitat is currently degraded due to high disturbance levels from urban development and human use. The habitat in and around Grand Canyon Village would continue to provide for wildlife species that are habituated or highly adaptable to the human environment, such as deer, birds, squirrels, and rodents. Distribution and abundance of these wildlife species in and around the project area would not substantially change.

Implementing any of the action alternatives would result in a long-term, minor, adverse impact mainly due to the minor amounts of habitat lost.

Cumulative Impacts. The combined impact of this proposal with past, present, and foreseeable future actions would be the continued loss of this and other adjacent forested habitats due to continued urban development and slow expansion of Grand Canyon Village. The remaining ponderosa-pinyon-gambel oak-juniper habitat, as well as other forested habitats, in the Grand Canyon Village area would continue to provide for wildlife that are habituated to or have a high tolerance to human activity. In addition, the remaining ponderosa-pinyon-gambel oak-juniper habitat would continue to age and slowly decline in health and vigor. Incidences of diseases, such as dwarf mistletoe, would continue to increase, resulting in an increased risk of outbreak to insects or disease. In addition, as the forested habitat ages, it would become more susceptible to crown fire due to increased crown closure, increased down woody debris, and development of a second forest canopy.

Conclusion. Implementing any of the action alternatives would result in a long-term, minor, adverse impact mainly due to the minor loss of habitat.

EXOTIC VEGETATION AND NOXIOUS WEEDS

Methodology. For the purpose of the exotic vegetation impact analysis, the following definitions for intensity and duration are used to characterize the impacts.

Intensity. Intensity of impact is discussed in context of the Grand Canyon Village and is defined as follows:

Negligible – impact to exotic vegetation is barely perceptible or not measurable, and confined to a very small area.

Minor – impact to exotic vegetation is perceptible or measurable, and it is localized.

Moderate – impact is clearly detectable and could have appreciable effect on exotic vegetation.

Major – impact would have a substantial, highly noticeable influence on exotic vegetation.

Duration. Duration of the impacts is defined as follows:

Short-term – impacts that would be less than about 5 years duration. Five years was selected as the difference between short and long term due to the length of construction (1-2 years) plus the length of revegetation and post-treatment (2-3 years).

Long-term – impacts that would be about 5 years or more in duration.

The main concerns with exotic vegetation and noxious weeds are spread of existing populations and introduction of new invaders. The number of existing exotic plant species present at a proposed site can be used to indicate the potential spread of existing populations. All existing exotic plant populations would be pre-treated under this proposal but the potential still exists for the population to spread.

The level of ground disturbance can be used to indicate the potential introduction of new invaders. Generally, disturbed areas favor the establishment of exotic vegetation. Therefore, the more ground disturbance that occurs generally results in a higher risk of introduction. All action alternatives would implement post-construction monitoring, revegetation efforts, and control treatments if necessary to contain an introduction if one were to occur. Table IV-1 summarizes the differences in the alternatives in respect to exotic vegetation.

Table IV-1: Indicators of spread and introduction of exotic species

Indicator	Alternative					
	A	B	C	D	E	F
Indicator of spread: number of species @ site	n/a	1	1	0	2	2
Indicator of introduction: amount of disturbance	n/a	.7 ha (1.7 ac)	1.1 Ha (2.6 ac)	1.0 ha (2.5 ac)	.8 ha (2.0 ac)	.8 ha (2.0 ac)

n/a = not applicable

Alternative A - No Action

Direct/Indirect Impacts. This alternative would not implement any ground disturbing activities and thus there would be no impacts to exotic vegetation and noxious weeds.

Cumulative Impacts. Alternative A would not contribute to cumulative effects. However, proposed foreseeable future developments would create new disturbed areas. Exotic vegetation and noxious weeds generally invade disturbed sites, and thus future developments would increase the potential for spread or introduction of exotic vegetation. Project specific mitigation measures would be implemented for these future projects to reduce the potential for spread or introduction of exotic vegetation.

Ongoing exotic vegetation control programs would continue, which includes hand pulling, mechanical treatments, and a small amount of herbicide control. However, due to the size of the current program (mostly volunteer work) existing populations of exotic vegetation would continue to slowly spread and replace native vegetation.

Conclusion. Implementing this alternative would have no impact on the spread or introduction of exotic vegetation.

Alternative B

Direct/Indirect Impacts. About .7 hectares (1.7 acres) of ground would be disturbed under this alternative. Ground disturbance would increase the short-term risk of spreading existing populations and introduction of new invaders. This alternative has the least ground disturbance of all the action alternatives; therefore it has the least potential for introducing new invaders. In addition, mitigation measures implemented with this alternative, such as pressure washing equipment, pre-treatment, and staging area restrictions, would reduce the short-term risk of spread and introduction. Mitigation measures, such as the revegetation effort, post-construction

monitoring, and follow-up treatments, would reduce the intensity of impact and long-term risk of spread and introduction.

Despite having the least potential for introducing new invaders, this alternative would not have the least potential for spreading existing populations because cheatgrass exists at the site. Construction equipment and site work would spread cheatgrass seeds throughout the disturbed area and provide a seedbed for establishment. However, pre-treatment of cheatgrass would occur with this alternative, reducing cheatgrass abundance and seed production prior to construction, and reducing the short-term risk the disturbed area would be colonized by cheatgrass after construction. However, due to the persistence of this species, individual plants would likely occur on the disturbed site after construction, which would constitute a short-term minor adverse impact. Post-construction monitoring, revegetation efforts, and control treatments would reduce the risk of cheatgrass and other exotic vegetation colonizing the site and becoming a long-term problem.

Cumulative Impacts. Ground disturbance associated with past, present, and foreseeable future developments, such as those described in Appendix B, would increase the long-term potential for spread and introduction of exotic vegetation. However, the ongoing exotic vegetation control program would continue and would help reduce the long-term risk of spread of existing exotic vegetation from past and present disturbed sites. Foreseeable future projects would incorporate mitigation measures to reduce the risk of spread and introduction of exotic vegetation. The combined impact of this proposal with past, present, and foreseeable future actions would be long-term minor adverse impact due to the continued ground disturbance and continued trend of increased potential for spread and introduction of exotic vegetation.

Conclusion. This alternative would result in a short-term minor adverse impact from exotic vegetation due to spread of existing cheatgrass and increased risk of spread and introduction immediately after construction. Mitigation measures associated with this alternative should be sufficient to reduce the risk that exotic vegetation does not become a long-term impact to the site and any spread or introduction is immediately contained.

Alternative C

Direct/Indirect Impacts. About 1.1 hectares (2.6 acres) of ground would be disturbed under this alternative. Ground disturbance would increase the short-term risk for spread of existing populations and introduction of new invaders. This alternative has the most ground disturbance of all the action alternatives; therefore it has the greatest potential for spreading existing populations and introducing new invaders. However, mitigation measures, such as the revegetation effort, post-construction monitoring, and follow-up treatments, would reduce the intensity of impact and long-term risk of spread and introduction.

Cheatgrass exists at the site and construction equipment and site work would spread cheatgrass seeds throughout the disturbed area and provide a seedbed for establishment. However, pre-treatment of cheatgrass would occur with this alternative, reducing cheatgrass abundance and seed production prior to construction, and reducing the short-term risk the disturbed area would be colonized by cheatgrass after construction. However, due to the persistence of this species, individual plants would likely occur on the disturbed site after construction, which would

constitute a short-term minor adverse impact. Post-construction monitoring, revegetation efforts, and control treatments would reduce the risk of cheatgrass and other exotic vegetation colonizing the site and becoming a long-term problem

Cumulative Impacts. The cumulative impacts of this alternative would be the same as those described for Alternative B.

Conclusion. This alternative would result in a short-term minor adverse impact from exotic vegetation due to spread of existing cheatgrass and increased risk of spread and introduction immediately after construction. Mitigation measures associated with this alternative should be sufficient to ensure exotic vegetation does not become a long-term impact to the site and any spread or introduction is immediately contained.

Alternative D

Direct/Indirect Impacts. About 1.0 hectares (2.5 acres) of ground would be disturbed under this alternative. Ground disturbance would increase the short-term risk for spread of existing populations and introduction of new invaders. This alternative has the second highest amount of ground disturbance of all the action alternatives; therefore it has the second highest potential for introducing new invaders. However, mitigation measures, such as the revegetation effort, post-construction monitoring, and follow-up treatments, would reduce the intensity of impact and long-term risk of spread and introduction.

Despite having the second highest amount of ground disturbance, this alternative does not result in the second highest risk of spread of existing populations. This alternative has the least risk of spread of existing populations because no exotic vegetation exists at the proposed site. The intensity of impacts is dependent on the success of the mitigation measures. If the mitigation measures are fully successful, then there would be no impacts from exotic vegetation. However, if mitigation measures are not successful and a new invader is introduced, then there would be a short-term minor adverse impact from the introduction.

Cumulative Impacts. The cumulative impacts of this alternative would be the same as those described for Alternative B.

Conclusion. This alternative would result in no impact to a short-term minor adverse impact due to the increased risk of introduction immediately after construction. Mitigation measures associated with this alternative should be sufficient to ensure exotic vegetation does not become a long-term impact to the site and any introduction is immediately contained.

Alternative E

Direct/Indirect Impacts. About .8 hectares (2.0 acres) of ground would be disturbed under this alternative. Ground disturbance would increase the short-term risk for spread of existing populations and introduction of new invaders. However, mitigation measures, such as the revegetation effort, post-construction monitoring, and follow-up treatments, would reduce the intensity of impact and long-term risk of spread and introduction.

Cheatgrass and Dalmatian toadflax are present at the proposed site. Construction equipment and site work could spread cheatgrass and Dalamatian toadflax seeds throughout the disturbed area and provide a seedbed for establishment. In addition, root pieces of Dalmation toadflax can produce new shoots and would be spread throughout the disturbed area from construction equipment. However, pre-treatment of cheatgrass and Dalmation toadflax would occur with this alternative, reducing species abundance and reducing seed production prior to construction. Despite, pre-treatment, it is likely that individual cheatgrass and Dalmation toadflax plants would sprout on the disturbed site after construction. Post-construction monitoring, revegetation efforts, and control treatments would ensure these species or other exotic vegetation do not colonize the site.

Cumulative Impacts. The cumulative impacts of this alternative would be the same as those described for Alternative B.

Conclusion. This alternative would result in a short-term minor adverse impact from exotic vegetation due to spread of existing exotic plant populations and increased risk of spread and introduction immediately after construction. Mitigation measures associated with this alternative should be sufficient to ensure exotic vegetation does not become a long-term impact to the site and any spread or introduction is immediately contained.

Alternative F – Preferred

Direct/Indirect Impacts. The direct and indirect impacts of this alternative would be the same as those described for Alternative E.

Cumulative Impacts. The cumulative impacts of this alternative would be the same as those described for Alternative B.

Conclusion. This alternative would result in a short-term minor adverse impact from exotic vegetation due to spread of existing exotic plant populations and increased risk of spread and introduction immediately after construction. Mitigation measures associated with this alternative should be sufficient to ensure exotic vegetation does not become a long-term impact to the site and any spread or introduction is immediately contained.

THREATENED, ENDANGERED, AND SPECIES OF CONCERN – WILDLIFE

Methodology. For the purpose of the wildlife species of concern analysis, the following definitions for intensity and duration are used to characterize the impacts.

Intensity. Intensity of impact is discussed in context of the Grand Canyon Village and is defined as follows:

Negligible – impact to wildlife species of concern or their habitats is barely perceptible or not measurable, and confined to a very small area.

Minor – impact to wildlife species of concern or their habitats is perceptible or measurable, and it is localized.

Moderate – impact is clearly detectable and could have appreciable effect on wildlife species of concern or their habitats.

Major – impact would have a substantial, highly noticeable influence on wildlife species of concern or their habitats.

Duration. Duration of the impacts is defined as follows:

Short-term – impacts that would be less than about 2 years duration. Three years was selected as the difference between short and long term due to the length of construction (1-2 years).

Long-term – impacts that would be about 3 years or more in duration.

The impact analysis for wildlife threatened, endangered, or special status species is described in terminology consistent with the regulations of the Council on Environmental Quality (CEQ). It is intended, however, to comply with requirements of both the National Environmental Policy Act (NEPA) and Section 7 of the Endangered Species Act. To meet requirements of Section 7 of the Endangered Species Act, a determination of effect for each alternative is included in the "Determination" section of each alternative.

Alternative A

Direct/Indirect Impacts. No vegetation manipulation or construction activities are proposed under Alternative A. Therefore the existing condition would remain the same. No habitat for any listed wildlife species would be impacted, and no new sources of disturbance would be introduced with this alternative. There would be no short or long-term impacts to any listed wildlife species associated with this alternative.

Cumulative Impacts. Alternative A would not contribute to cumulative impacts. However, the trend of past, present, and foreseeable future actions of urban development and slow expansion of Grand Canyon Village would continue. Habitat for condors would not be affected but the continued urbanization of the village area would slowly increase the long-term potential of human interaction with condors. Human interaction with condors could adversely affect condor behavior due to habituation to humans; however, the intensity of this impact would probably be negligible to minor.

Conclusion. There would be no short or long-term impacts.

Determination. Alternative A would have no effect on any federal or state listed wildlife species.

All Action Alternatives

Direct/Indirect Impacts. None of the action alternatives would affect black-footed ferret, humpback chub, Kanab ambersnail, razorback sucker, southwestern willow flycatcher, Little Colorado spinedace, Mexican spotted owl, bald eagle, American peregrine falcon, northern goshawk or western red bat because these species are not present. In addition, none of the action

alternatives would affect designated critical habitat for Mexican spotted owl because the habitat does not exist at or near any of the proposed sites.

None of the action alternatives would affect California condor nesting habitat because the nearest potential nesting habitat is below the rim. None of the proposed sites are close enough to the rim of the canyon to increase disturbance to any potential habitat below the rim. Foraging behavior would not be impacted because none of the proposed alternatives would affect the availability or distribution of food sources for condors (carcasses).

The main concern with California condors in relation to the action alternatives would be contact with humans. Condor contact with humans would be of concern if visitors or construction workers harass the birds or if the birds become habituated to humans. Mitigation measures to educate construction workers of condor concerns and to cease activities if condors are present would reduce potential disturbance from construction activities on the birds. Hazing by permitted park employees would ensure condors do not become habituated to humans. This would result in a negligible to minor adverse impact to condor behavior.

Cumulative Impacts. The combined effect of this proposal with past, present, and foreseeable future actions would be the continued trend of urban development and slow expansion of Grand Canyon Village. Habitat for condors would not be affected but the continued urbanization of the village area would slowly increase the potential of human interaction with condors. However, the added risk to condors would be negligible from any increased development at Grand Canyon Village because of the existing high levels of human activity and development.

Conclusion. The action alternatives would have no impact to any listed species except for California condor. The action alternatives would have a negligible to minor adverse impact to condor due to the increased potential for human-condor interaction during construction.

Determinations.

No Effect to black-footed ferret, humpback chub, Kanab ambersnail, razorback sucker, southwestern willow flycatcher, Little Colorado spinedace, Mexican spotted owl, bald eagle, American peregrine falcon, northern goshawk or western red bat due to fact they are not present.

No Effect to designated critical habitat for Mexican spotted owl due to the fact the proposed activities do not occur at or near any designated critical habitat.

May affect, not likely to adversely affect California condor due to the potential of human-condor interaction during construction.

TRAFFIC FLOW

Methodology. For the purpose of the impact analysis for traffic flow, the following definitions for intensity and duration are used to characterize the impacts.

Intensity. Intensity of impact is discussed in context of traffic along Center Road and is defined as follows:

Negligible – impact to traffic is barely perceptible or not measurable, and confined to a very small area.

Minor – impact to traffic is perceptible or measurable, and it is localized.

Moderate – impact is clearly detectable and could have appreciable effect on traffic.

Major – impact would have a substantial, highly noticeable influence on this traffic.

Duration. Duration of the impacts is defined as follows:

Short-term – impacts that would be less than about 2 years duration. Two years was selected as the difference between short and long term due to the length of construction (1-2 years).

Long-term – impacts that would be about 3 years or more in duration.

Alternative A - No Action

Direct/Indirect Impacts. There are no actions proposed under Alternative A. There would be no disruption in traffic flow from construction activities, and the existing condition would remain the same.

Cumulative Impacts. Alternative A would not contribute to cumulative impacts. However, the number of foreseeable future actions associated with construction activities could have a short-term increase in construction traffic. Construction of the new NPS maintenance facility, Mather Campground, Horace Albright Training Center, Heritage Education Center, Learning Center housing, walkways, Ranger Operations building, mule barn, and Pinyon Park housing could all increase construction traffic along Center Road. However, the implementation of a transit system would decrease traffic in the long-term. The transit system would likely reduce traffic numbers more than construction activities would increase traffic.

Conclusion. There would be no impacts to traffic flow if this alternative were implemented.

Alternative B & C

Alternatives B and C would have about the same impact on traffic flow because they are both located in approximately the same location. The main difference between these alternatives, in terms of traffic flow, is Alternative C is located further south along Center Road. The minor difference in location would not change the impacts on traffic flow. Therefore the impacts of the Alternatives B and C on traffic flow will be addressed together.

Direct/Indirect Impacts. The biggest impact to traffic flow from Alternative B or C would be the closure of one of the two entrances to the existing NPS maintenance facility. The closure of the east entrance to the existing NPS maintenance facility would need to occur during the pavement of the parking area for the emergency services building. This closure would disrupt users of the NPS maintenance facility and the contracting office in the same area. However, this disruption would be limited to the time it takes to pave the parking area, which probably would only be two

or three days. In addition, this disruption would not affect visitors because this area is an administrative area, which visitors would not normally visit.

Construction vehicles would utilize Center Road to reach the construction site, which would increase traffic load. Minor traffic congestion could occur on Center Road during the mornings and evenings when construction workers are arriving and departing work. The morning arrival is likely to have a greater impact on traffic flow than evening departure because construction workers are likely to arrive from Tusayan along Center Road and need to make a left turn onto Lapp Loop Road. In addition, the morning arrival could coincide with the beginning of school, which is of concern due to the close proximity of a school crosswalk, about 100 meters (330 feet) north of Lapp Loop Road. Children from the Park Circle and Pines housing areas would most likely be the users of this crosswalk as the walk to and from school. The additional traffic congestion would increase the risk of pedestrian-vehicle conflict at the crosswalk. However this is likely to be a negligible increase in risk due to crosswalk signs, flashing lights, and the fact most construction workers would not drive past the crosswalk.

The evening departure of construction workers would probably have a negligible impact on traffic flow because most workers would make a right turn onto Center Road and depart the park. In addition, evening departure is less likely to coincide with the departure of school because the standard work day ends after the end of school.

Cumulative Impacts. The number of foreseeable future actions associated with construction activities could have a short-term increase in construction traffic. Construction of the new NPS maintenance facility, Mather Campground, Horace Albright Training Center, Heritage Education Center, Learning Center housing, walkways, Ranger Operations building, mule barn, and Pinyon Park housing could all have a minor to moderate increase of traffic along Center Road. However, the implementation of a transit system would decrease traffic in the long-term. The transit system would likely reduce traffic numbers more than construction activities would increase traffic. Therefore, the combined impact of Alternative B with past, present, and foreseeable future actions would likely be a minor to moderate, adverse impact in the short-term and a minor, beneficial impact in the long-term.

Conclusion. Implementation of Alternatives B or C would result in a short-term, minor, adverse impact mainly due to traffic disruptions at the existing NPS maintenance facilities.

Alternative D

Direct/Indirect Impacts. Alternative D would have the least impact to traffic flow of all the action alternatives due to the fact it is located away from any existing development and would not disrupt traffic of any existing operations. Construction vehicles would be to park at the construction site which would be located off of Center Road. There would be an increase in construction traffic, but relative to existing traffic load, this would be a negligible increase. The only concern with the construction traffic would be the need for most construction vehicles to make a left turn into the construction site from Center Road. This would have a negligible impact on traffic flow because the traffic load is light enough on Center Road as to permit left turns without problems.

Cumulative Impacts. The cumulative impacts of Alternative D would be the same as those described for Alternatives B and C.

Conclusion. Implementation of Alternative D would result in a short-term, negligible, adverse impact due to increased construction traffic.

Alternative E & F

Alternatives E and F would have about the same impact on traffic flow because they are both located at the clinic site. The differences in these alternatives would not change the impacts on traffic flow. Therefore the impacts of the Alternatives E and F on traffic flow will be addressed together.

Direct/Indirect Impacts. The biggest impact to traffic flow from Alternative E or F would be the disruption of traffic and parking at the clinic. Implementation of either of these alternatives would require the use of the existing main parking lot by construction workers. Currently residents of five trailers located adjacent to the parking lot, clinic users, and clinic employees utilize the main parking lot. This disruption at the clinic from increased traffic congestion and competition for parking spaces would constitute a short-term, minor to moderate, adverse impact. This disruption would be limited to the construction period and would not affect most visitors because most visitors do not visit the clinic.

Increased traffic load from construction vehicles would generally occur during the mornings and evenings when construction workers are arriving and departing work. This increase in traffic load would have a negligible impact to traffic flow on Center Road. However, morning arrivial could coincide with the beginning of school, which is of concern due to walkways located around the clinic. These walkways are used by children from a portion of the Pines housing area as the walk to and from school. The additional traffic congestion would increase the risk of pedestrian-vehicle conflicts of the walkways as they cross Clinic Road. However, this is likely to be a negligible increase in risk because Clinic Road is a low speed road.

Cumulative Impacts. The cumulative impacts of Alternative E or F would be the same as those described for Alternatives B and C.

Conclusion. Implementation of Alternatives E or F would result in a short-term, minor to moderate, adverse impact mainly due to traffic and parking disruptions at the clinic.

CULTURAL RESOURCES

Methodology

The assessment of impacts on cultural resources and historic properties was made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing Section 106 of the National Historic Preservation Act. Following a determination of the areas of potential effect, cultural resources were identified within these areas that are either listed in or eligible for listing in the National Register of Historic Places.

An assessment was made of the nature and extent of effects on cultural resources anticipated from implementing proposed undertakings. Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion in the National Register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration was given both to the effects anticipated at the same time and place of the undertaking, and to those potentially occurring indirectly at a later time and distance.

To provide consistency with requirements of the National Environmental Policy Act, the effects on cultural resources are also described in terminology intended to convey the duration, intensity, and beneficial or adverse nature of potential impacts. Impacts could be of short term, long term, or permanent duration. (Analysis of the duration of impacts is required under the National Environmental Policy Act, but is not required and is not usually considered in assessing effects in terms of the National Historic Preservation Act). The intensity of impacts is defined as follows:

> *negligible* – The impact is barely perceptible and not measurable. Significant character-defining attributes of historic properties (including the informational potential of archeological resources) are not appreciably diminished by the undertaking.
>
> *minor* – The impact is perceptible and measurable. The effects remain localized and confined to a single element contributing to the significance of a larger national register property/district, or archeological site(s) with low to moderate data potential.
>
> *moderate* – The impact is sufficient to alter character-defining features of historic properties, generally involving a single or small group of contributing elements, or archeological site(s) with moderate to high data potential.
>
> *major* – The impact results in a substantial and highly noticeable change in character-defining features of historic properties, generally involving a large group of contributing elements and/or individually significant property, or archeological site(s) with high to exceptional data potential.

Alternative A (No Action)

Direct/Indirect Impacts. Identified historic properties would not be impacted under the no action alternative. There would be no project-related ground disturbance with the potential to adversely impact archeological resources. Historic structures would not be altered, nor would new construction occur that could impact the integrity of the Grand Canyon Village Historic District.

Cumulative Impacts. The no-action alternative would not contribute to cumulative impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact

archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

The no-action alternative would also not contribute to cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

Conclusion. The no-action alternative would not impact identified cultural resources, and would not contribute to past, present or reasonably foreseeable cumulative effects on cultural resources in the area.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, the no-action alternative would have no effect on historic properties.

Alternative B

Direct/Indirect Impacts. Construction at this location would not impact identified archeological resources. Previously identified archeological sites in the general vicinity lie outside the area of potential project impacts.

Of the alternative project locations, this site is closest to the Grand Canyon Village Historic District. With appropriate and compatible design, new construction at this location would be expected to have negligible to minor adverse impacts on the district's historic architectural character. Construction of a new access/egress connection linking the EMS facility with Center Road would also be expected to have negligible to minor adverse impacts on the road as a cultural landscape structure contributing to the district's significance. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged.

Cumulative Impacts. Alternative B would be expected to have no cumulative adverse impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact

archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

This alternative would also have negligible to minor cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

New construction outside the periphery of the district also has the potential to visually intrude on the integrity of the district's historic setting, particularly along the Center Road corridor which formerly served as the principal approach route to Grand Canyon Village. Negligible to minor cumulative adverse impacts on the historic character of the district would be expected provided new facilities are sensitively designed.

Conclusion. Construction of new facilities at this location would have no impacts on identified archeological resources. Although new construction along the Center Road approach to the Grand Canyon Village Historic District has the potential to adversely alter the historic setting, EMS facilities would be sensitively designed to ensure they do not intrude on the district nor diminish character-defining qualities of Center Road (a structure contributing to the district's significance). Consequently, negligible to minor long-term adverse impacts on features contributing to the district's historic significance would be expected.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, this alternative would be expected to have no adverse effect on historic properties. Project undertakings would not substantially diminish the character-defining qualities for which identified historic properties (e.g. Grand Canyon Village Historic District) are listed in the National Register of Historic Places.

Alternative C

Direct/Indirect Impacts. Construction at this location would not impact identified archeological resources. Previously identified archeological sites in the general vicinity lie outside the area of potential project impacts.

This site is just south of Site 1, and is therefore in proximity to the Grand Canyon Village Historic District. With appropriate and compatible design, new construction at this location would be expected to have negligible to minor adverse impacts on the district's historic architectural character. Construction of a new access/egress connection linking the EMS facility with Center Road would also be expected to have negligible to minor adverse impacts on the

road as a cultural landscape structure contributing to the district's significance. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged.

Cumulative Impacts. Alternative C would be expected to have no cumulative adverse impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

This alternative would also have negligible to minor cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

New construction outside the periphery of the district also has the potential to visually intrude on the integrity of the district's historic setting, particularly along the Center Road corridor which formerly served as the principal approach route to Grand Canyon Village. Negligible to minor cumulative adverse impacts on the historic character of the district would be expected provided new facilities are sensitively designed.

Conclusion. Construction of new facilities at this location would have no impacts on identified archeological resources. Although new construction along the Center Road approach to the Grand Canyon Village Historic District has the potential to adversely alter the historic setting, EMS facilities would be sensitively designed to ensure they do not intrude on the historic district nor diminish character-defining qualities of Center Road (a structure contributing to the district's significance). Consequently, negligible to minor long-term adverse impacts on features contributing to the district's historic significance would be expected.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, this alternative would be expected to have no adverse effect on historic properties. Project undertakings would not substantially diminish the character-defining qualities for which identified historic properties (e.g. Grand Canyon Village Historic District) are listed in the National Register of Historic Places.

Alternative D

Direct/Indirect Impacts. Construction at this location (largely an undisturbed wooded area) would not impact identified archeological resources. Previously identified archeological sites in the general vicinity lie outside the area of potential project effects.

This alternative site location is the furthest from the Grand Canyon Village Historic District. Nevertheless, with appropriate and compatible design, new construction at this location would be expected to have negligible to minor adverse impacts on the district's historic architectural character. Construction of a new access/egress connection linking the EMS facility with Center Road would also be expected to have negligible to minor adverse impacts on the road as a cultural landscape structure contributing to the district's significance. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged.

Cumulative Impacts. Alternative D would be expected to have no cumulative adverse impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

This alternative would also have negligible to minor cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

New construction outside the periphery of the district also has the potential to visually intrude on the integrity of the district's historic setting, particularly along the Center Road corridor which formerly served as the principal approach route to Grand Canyon Village. Negligible to minor cumulative adverse impacts on the historic character of the district would be expected provided new facilities are sensitively designed.

Conclusion. Construction of new facilities at this location would have no impacts on identified archeological resources. Although new construction along the Center Road approach to the

Grand Canyon Village Historic District has the potential to adversely alter the historic setting, EMS facilities would be sensitively designed to ensure they do not intrude on the historic district nor diminish character-defining qualities of Center Road (a structure contributing to the district's significance). Consequently, negligible to minor long-term adverse impacts on features contributing to the district's historic significance would be expected.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, this alternative would be expected to have no adverse effect on historic properties. Project undertakings would not substantially diminish the character-defining qualities for which identified historic properties (e.g. Grand Canyon Village Historic District) are listed in the National Register of Historic Places.

Alternative E

Direct/Indirect Impacts. Prehistoric site (B:16:263) is located within 75 to 90 feet south of the clinic building's parking lot. Although located within the area of potential project impacts, the site would be avoided by the temporary placement of snow fencing or other measures to mark the acceptable limits of construction in the site vicinity.

This alternative site location is moderately close to the Grand Canyon Village Historic District. With appropriate and compatible design, new construction at this location would be expected to have negligible to minor adverse impacts on the district's historic architectural character. Construction of a new access/egress connection linking the EMS facility with Center Road would also be expected to have negligible to minor adverse impacts on the road as a cultural landscape structure contributing to the district's significance. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged.

NPS designers have also strived to ensure that designs for the new stand alone EMS building are compatible with the adjacent clinic building. Although the clinic has been recommended ineligible for listing in the National Register of Historic Places, it was built during the NPS "Mission 66" construction period, and exhibits modern architectural elements and detailing associated with that period.

Cumulative Impacts. With avoidance of archeological site B:16:263, Alternative E would be expected to have no cumulative adverse impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

This alternative would also have negligible to minor cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

New construction outside the periphery of the district also has the potential to visually intrude on the integrity of the district's historic setting, particularly along the Center Road corridor which formerly served as the principal approach route to Grand Canyon Village. Negligible to minor cumulative adverse impacts on the historic character of the district would be expected provided new facilities are sensitively designed.

Conclusion. Construction of new facilities at this location would have no impacts on identified archeological resources provided appropriate measures to avoid site B:16:263 are carried out. Although new construction along the Center Road approach to the Grand Canyon Village Historic District has the potential to adversely alter the historic setting, EMS facilities would be sensitively designed to ensure they do not intrude on the historic district nor diminish character-defining qualities of Center Road (a structure contributing to the district's significance). Consequently, negligible to minor long-term adverse impacts on features contributing to the district's historic significance would be expected. Although the existing clinic has been recommended ineligible for the National Register of Historic Places, designs for an adjacent stand alone building for EMS operations would be compatible with the clinic's architectural character.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, this alternative would be expected to have no adverse effect on historic properties. Project undertakings would not substantially diminish the character-defining qualities for which identified historic properties (e.g. Grand Canyon Village Historic District) are listed in the National Register of Historic Places.

Alternative F - Preferred

Direct/Indirect Impacts. Prehistoric site (B:16:263) is located within 75 to 90 feet south of the clinic building's parking lot. Although located within the area of potential project impacts, the site would be avoided by the temporary placement of snow fencing or other measures to mark the acceptable limits of construction in the site vicinity.

This alternative site location is moderately close to the Grand Canyon Village Historic District. With appropriate and compatible design, new construction at this location would be expected to have negligible to minor adverse impacts on the district's historic architectural character.

Construction of a new access/egress connection linking the EMS facility with Center Road would also be expected to have negligible to minor adverse impacts on the road as a cultural landscape structure contributing to the district's significance. Previous widening and resurfacing of Center Road in 1994 partially modified the road's character-defining qualities, although the alignment remains unchanged.

NPS designers have also strived to ensure architectural design compatibility for adaptive use of the clinic building along with construction of a new addition. Although the clinic has been recommended ineligible for listing in the National Register of Historic Places, it was built during the NPS "Mission 66" construction period, and exhibits modern architectural elements and detailing associated with that period.

Cumulative Impacts. With avoidance of archeological site B:16:263, Alternative F would be expected to have no cumulative adverse impacts on identified archeological resources. Some archeological resources at the South Rim and throughout the Grand Canyon have been adversely impacted from past construction disturbance, perhaps occurring before establishment of the park and/or as a result of inadvertent impacts prior to the legal requirements for archeological survey, site protection, and mitigation. Visitor use pressures have also contributed to past archeological impacts. Combined with increasing visitor use in the area, other current and foreseeable construction projects (e.g. proposed light rail transportation system, greenway, and other facilities) also have the potential to impact archeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

This alternative would also have negligible to minor cumulative adverse impacts on the Grand Canyon Village Historic District. The historic integrity of some buildings and structures within the district is threatened by structural deterioration. Likewise, the construction of modern, non-contributing buildings have compromised the district's architectural integrity to a minor degree. Other foreseeable projects (e.g. restoration of the ranger operations building, proposed heritage education campus, new NPS maintenance facility, etc.) also have the potential to impact historic buildings scheduled for adaptive use, or to visually alter the district's historic setting as a result of new construction. The NPS would avoid or mitigate potential adverse impacts by ensuring that new construction adheres to appropriate design guidelines, and that preservation maintenance and/or more comprehensive rehabilitation is carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

New construction outside the periphery of the district also has the potential to visually intrude on the integrity of the district's historic setting, particularly along the Center Road corridor which formerly served as the principal approach route to Grand Canyon Village. Negligible to minor cumulative adverse impacts on the historic character of the district would be expected provided new facilities are sensitively designed.

Conclusion. Construction of new facilities at this location would have no impacts on identified archeological resources provided appropriate measures to avoid site B:16:263 are carried out. Although new construction along the Center Road approach to the Grand Canyon Village Historic District has the potential to adversely alter the historic setting, EMS facilities would be sensitively designed to ensure they do not intrude on the historic district nor diminish character-

defining qualities of Center Road (a structure contributing to the district's significance). Consequently, negligible to minor long-term adverse impacts on features contributing to the district's historic significance would be expected. Although the existing clinic has been recommended ineligible for the National Register of Historic Places, designs for adaptively using the building and constructing a new addition for EMS operations would be compatible with the clinic's architectural character.

Section 106 Summary. In accordance with the Advisory Council on Historic Preservation's regulations (36CFR800) implementing Section 106 of the National Historic Preservation Act, this alternative would be expected to have no adverse effect on historic properties. Project undertakings would not substantially diminish the character-defining qualities for which identified historic properties (e.g. Grand Canyon Village Historic District) are listed in the National Register of Historic Places.

IMPAIRMENT

In addition to determining the environmental consequences of the preferred and other alternatives, National Park Service policy (*Management Policies, 2001*) requires analysis of potential effects to determine whether or not actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute and impairment. An impact would be more likely to constitute an impairment to the extent it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination on impairment is made for every impact topic except Traffic Flow.

● All action alternatives would only have a long-term, minor, adverse impact on the soil resource mainly due to soil displacement. This minor impact would not constitute impairment because it would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, minor impacts from soil displacement would not harm the natural integrity of the park due to the limited extent.

● All action alternatives would only have a long-term, minor, adverse impact on ponderosa-pinyon-gambel oak-juniper habitat due to removal of the habitat to accommodate the building and parking area. These minor impacts would not constitute impairment because it would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, minor losses of this habitat type would not harm the natural integrity of the park due to the ubiquity of this habitat type at Grand Canyon National Park.

● All action alternatives would only have a short-term minor adverse impact from exotic vegetation due to spread of existing populations and/or increased risk of spread and introduction immediately following construction activities. In addition, the impact of the action alternatives combined with past, present, and foreseeable future actions would cumulatively have a long-term minor adverse impact. These impacts from exotic vegetation would not constitute impairment. Although it is not desirable, minor increases in exotic vegetation would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, minor increases in exotic vegetation would not harm the natural integrity of the park because it would be limited in extent [maximum of 1.1 ha (2.6 acres) in Alternative C] and severity (minor).

● All action alternatives would have no impact to all federal and state listed wildlife species except for the California condor. The alternatives may affect, but are not likely to adversely affect the California condor. The negligible to minor impact to the California condor would not constitute impairment because it would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, negligible to minor impacts to condor behavior would not harm the natural integrity of the park.

● All action alternatives would have no impact on archeological resources and negligible to minor long-term adverse impacts on the Grand Canyon Village Historic District's architectural character. This would not constitute impairment because it would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, negligible to minor impacts to historic properties would not harm the cultural integrity of the park.

CHAPTER 5 – CONSULTATION AND COORDINATION

PUBLIC INVOLVEMENT

Although public meetings have not been held specifically on the proposed emergency services building, the actions evaluated in this EA are referenced in the GMP that has been distributed for public review. During preparation of the GMP, the NPS distributed several newsletters to inform the public of planning activities and request comments on issues of concern in the park. In addition, a series of public meetings were held during the development of the GMP to solicit comments on proposed activities in the park.

In addition to public involvement during the preparation and review of the GMP, this EA will be distributed for public review and comment for at least 30 days. The list of agencies, organizations, and people to whom copies of this EA will be sent to is located in the project file and is available upon request.

CONSULTATION

The following organizations and agencies were contacted for information or assisted in identifying important issues, developing alternatives, or analyzing impacts.

Arizona Game and Fish Department (AGFD)

The NPS contacted the AGFD to discuss state listed endangered, threatened, and species of concern. The AFGD provided a list of species of concern through a letter dated January 13, 2000. On December 13, 2000 the NPS met with AGFD and discussed wildlife issues related to this project. The NPS has submitted a copy of this EA to the AFGD for review.

U.S. Fish and Wildlife Service (USFWS)

The NPS contacted the USFWS to discuss listed endangered, threatened, and species of concern. The USFWS provided a list of species of concern through a letter dated December 23, 1999. On December 13, 2000 the NPS met with USFWS and discussed wildlife issues related to this project. The NPS has submitted a copy of this EA to the USFWS and requested concurrence with the NPS's determination that the proposed action is not likely to adversely affect California condor.

Advisory Council on Historic Preservation (ACHP)

The National Park Service has provided the Advisory Council on Historic Preservation a copy of this environmental assessment. In accordance with 36CFR800, and the 1995 programmatic agreement among the National Park Service, the Arizona SHPO, and the Advisory Council on Historic Preservation regarding the draft General Management Plan/EIS for Grand Canyon National Park, the NPS will consider and address comments of the ACHP pertaining to potential project impacts on historic properties.

Arizona State Historic Preservation Office (SHPO)

The National Park Service has provided the Arizona SHPO a copy of this environmental assessment. In accordance with 36CFR800, and the 1995 programmatic agreement among

the National Park Service, the Arizona SHPO, and the Advisory Council on Historic Preservation regarding the draft General Management Plan/EIS for Grand Canyon National Park, the NPS will consider and address comments of the SHPO pertaining to potential project impacts on historic properties.

Affiliated Tribes

As part of its consultation efforts, the National Park Service has provided Indian tribes affiliated with Grand Canyon NP a copy of this environmental assessment. In accordance with 36CFR800, and the 1995 programmatic agreement among the National Park Service, the Arizona SHPO, and the Advisory Council on Historic Preservation regarding the draft General Management Plan/EIS for Grand Canyon National Park, the NPS will further consult with the tribes, and consider and address tribal comments pertaining to potential project impacts on historic properties (e.g. ethnographic resources and traditional cultural properties), and other resources and/or impact topics.

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